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# **APPENDIX E**

## **CULTURAL RESOURCES**

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## MANAGEMENT SUMMARY

McKenna et al. completed this Class III cultural resources investigation for the Bureau of Land Management (BLM) Barstow Field Office, Barstow, San Bernardino County, California. The study was completed under Field Authorization No. CA-680-12-17 (BLM State Permit No. CA-10-26), by Jeanette A. McKenna, M.A. and R.P.A., and Principal Investigator for McKenna et al. The studies were initiated in April, 2012, and completed in November, 2012. The field survey was conducted on May 21-22, 2012, also by Jeanette A. McKenna.

The APE was approved through consultation with James Shearer, BLM Archaeologist, Barstow Field Office. As approved, the APE consists of an 70 acre property described as being in the southern half of the southwestern quarter of Section 5, Township 3 North, Range 1 West (SBBM). McKenna et al. also included a buffer around the property, where accessible, to insure total coverage. The survey was completed by traversing paralleling transects at 10-15 meter intervals in areas where terrain permitted the systematic approach and discretionary coverage in the remaining areas.

Where the systematic survey was not possible, McKenna et al. conducted a subjective and/or reconnaissance level of investigation, following the terrain, working around vegetation and slopes, and avoiding slopes exceeding 40 degrees. All proposed or future activities to be conducted within this 70 acre property will be limited to this property and only existing access roads will be used. McKenna et al. calculated the APE to involve a minimum of 70 acres and a maximum of 110 acres (with the buffer). The survey involved approximately 70 acres of the overall 110 acres and emphasized areas of potential effect.

Previous research identified one prehistoric archaeological site within the project area (36-005556), a lithic scatter just northeast of the APE, but within the buffer zone. This site was previously impacted by the development of the White Knob Haul Road and little evidence of the site remains. In addition, in 2012, McKenna et al. recorded a historic period resource, 36-024514 (CA-SBR-15565H; the Fife Mining Claim Road). McKenna et al. concluded 36-005556 is not a significant resource, but has a potential to yield additional data that may change this conclusion. Overall, the area should be considered

sensitive for additional cultural resources and an archaeological monitoring program, as recommended for the adjacent haul road, should be considered.

The Fife Mining Claim Road (36-024514) is not a significant resource. It has been impacted by prior construction and no artifacts or other features were found in association with the segment of the road running through the current project area. Therefore, McKenna et al. is not recommending any additional studies with respect to this resource. McKenna et al. has completed updated archaeological site records for these resources and these forms are appended to this report.

At this time, given the nature of the resources presented in this report, McKenna et al. is not recommending any Phase III or Class IV investigations. Rather, McKenna et al. is recommending the eastern half of the proposed White Knob Land Sale project area be monitored in conjunction with the haul road improvements project and during future ground altering activities. Monitoring of the western half of the project area can be considered at a lesser level and at the discretion of the BLM archaeological review. The extent and duration of the monitoring program can be defined once future plans are defined.

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Jeanette A. McKenna, Principal Investigator, McKenna et al.

Date



**CLASS III CULTURAL RESOURCES SURVEY**  
**WHITE KNOB QUARRY REVISION PROJECT**

**Amendment to Reclamation Plan No. 86M-04**  
**Lucerne Valley Area, San Bernardino County, California**

**For Submittal to:**

Bureau of Land Management  
Barstow Field Office  
2601 Barstow Road  
Barstow, CA 92311

**Prepared for:**

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Bai "Tom" Tang, Principal Investigator  
Michael Hogan, Principal Investigator

November 14, 2008  
CRM TECH Contract No. 2280A  
BLM Cultural Resources Use Permit No. CA-07-12  
Fieldwork Authorization No. FA-680-09-06

## NATIONAL ARCHAEOLOGICAL DATABASE INFORMATION

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**Date:** November 14, 2008 (fieldwork completed on October 2-3, 2008)

**Title:** Class III Cultural Resources Survey: White Knob Quarry Revision Project, Amendment to Reclamation Plan No. 86M-04, Lucerne Valley Area, San Bernardino County, California

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**USGS Quadrangle:** Butler Peak, Calif., 7.5' quadrangle (Sections 5-8, T3N R1W, San Bernardino Base Meridian)

**Project Size:** Approximately 298 acres

**Keywords:** Lucerne Valley area, southern Mojave Desert, San Bernardino County; Phase I/ Class III historical/ archaeological resources survey; Assessor's Parcel Nos. 446-011-04, -05, and -06 and 446-021-11 and -35; no "historic property" found

## MANAGEMENT SUMMARY

Between September and November 2008, at the request of Webber and Webber Mining Consultants, Inc., CRM TECH performed a cultural resources study on approximately 298 acres of vacant land, including an existing quarry, in an unincorporated area near the community of Lucerne Valley, San Bernardino County, California. The study is a part of the environmental review process for a proposed amendment to Reclamation Plan No. 86M-04, which would increase the area authorized for the White Knob-White Ridge Limestone Mine operated by OMYA California, Inc., under permit by the U.S. Bureau of Land Management (BLM).

The Area of Potential Effects (APE) for the proposed undertaking is located on Assessor's Parcel Nos. 446-011-04, -05, and -06 and 446-021-11 and -35, within Sections 5-8 of T3N R1W, San Bernardino Base Meridian, as depicted in the USGS Butler Peak, Calif., 7.5' quadrangle. A total 47.5 acres of the APE consists of U.S. government land under the jurisdiction of the BLM, which mandates compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

The purpose of the present study is to provide the BLM with the necessary information and analysis to determine whether the proposed undertaking would have any effects on historic properties that may exist in or near the APE, as mandated by Section 106. In order to identify such historic properties, CRM TECH conducted a historical/archaeological resources records search, pursued historical background research, contacted Native American representatives, and carried out a systematic field survey.

Throughout the course of the study, no "historic properties," as defined by Section 106 regulations, were encountered within or adjacent to the APE. However, Native American input during this study suggests that the APE lies within or in close proximity to a potential site of traditional cultural value, which the Native American source did not identify but seeks to protect through further consultation with the lead agency. Based on these findings, CRM TECH recommends that the BLM initiate formal government-to-government consultation with the Tongva Ancestral Territorial Tribal Nation for additional information on the site of Native American cultural concern.

No other cultural resources investigation is recommended for the proposed undertaking unless project plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the undertaking, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

## TABLE OF CONTENTS

MANAGEMENT SUMMARY .....	i
INTRODUCTION .....	1
SETTING.....	3
Current Natural Setting .....	3
Cultural Setting .....	4
Prehistoric Context .....	4
Ethnohistoric Context .....	4
Historic Context.....	5
RESEARCH DESIGN.....	5
RESEARCH METHODS.....	8
Records Search.....	8
Historical Background Research.....	8
Native American Participation .....	8
Field Survey .....	8
RESULTS AND FINDINGS.....	9
Records Search.....	9
Historical Background Research.....	9
Native American Participation .....	9
Field Survey .....	12
DISCUSSION.....	12
CONCLUSION AND RECOMMENDATIONS .....	13
REFERENCES.....	14
APPENDIX 1: Personnel Qualifications.....	15
APPENDIX 2: Correspondence with Native American Representatives.....	20
APPENDIX 3: Locations of Recorded Sites (Confidential).....	31

## LIST OF FIGURES

Figure 1. Project vicinity .....	1
Figure 2. Area of Potential Effect.....	2
Figure 3. Overview of the current natural setting of the APE.....	3
Figure 4. Previous cultural resources studies .....	10
Figure 5. The APE and vicinity in 1855-1894 .....	11
Figure 6. The APE and vicinity in 1898-1899 .....	11
Figure 7. The APE and vicinity in 1945-1952 .....	11

## LIST OF TABLES

Table 1. Previously Recorded Cultural Resources in the Vicinity .....	9
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## INTRODUCTION

Between September and November 2008, at the request of Webber and Webber Mining Consultants, Inc., CRM TECH performed a cultural resources study on approximately 298 acres of vacant land, including an existing quarry, in an unincorporated area near the community of Lucerne Valley, San Bernardino County, California (Fig. 1). The study is a part of the environmental review process for a proposed amendment to Reclamation Plan No. 86M-04, which would increase the area authorized for the White Knob-White Ridge Limestone Mine operated by OMYA California, Inc., under permit by the U.S. Bureau of Land Management (BLM).

As currently proposed, the undertaking includes an increase to the disturbance limits of the quarry operations by 147 acres to account for boulder roll-down to the north and the west; removal and stabilization of talus materials on the western slope to minimize future roll-down; expansion of an existing overburden site by 15 acres, 10 of which are currently undisturbed; the addition of three new overburden sites; and modification to an existing access road to the White Knob-White Ridge Limestone Mine.

The Area of Potential Effects (APE) for the proposed undertaking is located on Assessor's Parcel Nos. 446-011-04, -05, and -06 and 446-021-11 and -35, within Sections 5-8 of T3N R1W, San Bernardino Base Meridian, as depicted in the USGS Butler Peak, Calif., 7.5' quadrangle (Fig. 2). A total 47.5 acres of the APE consists of U.S. government land under the jurisdiction of the BLM, which mandates compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

CRM TECH performed the current study to provide the BLM with the necessary information and analysis to determine whether the proposed undertaking would have any

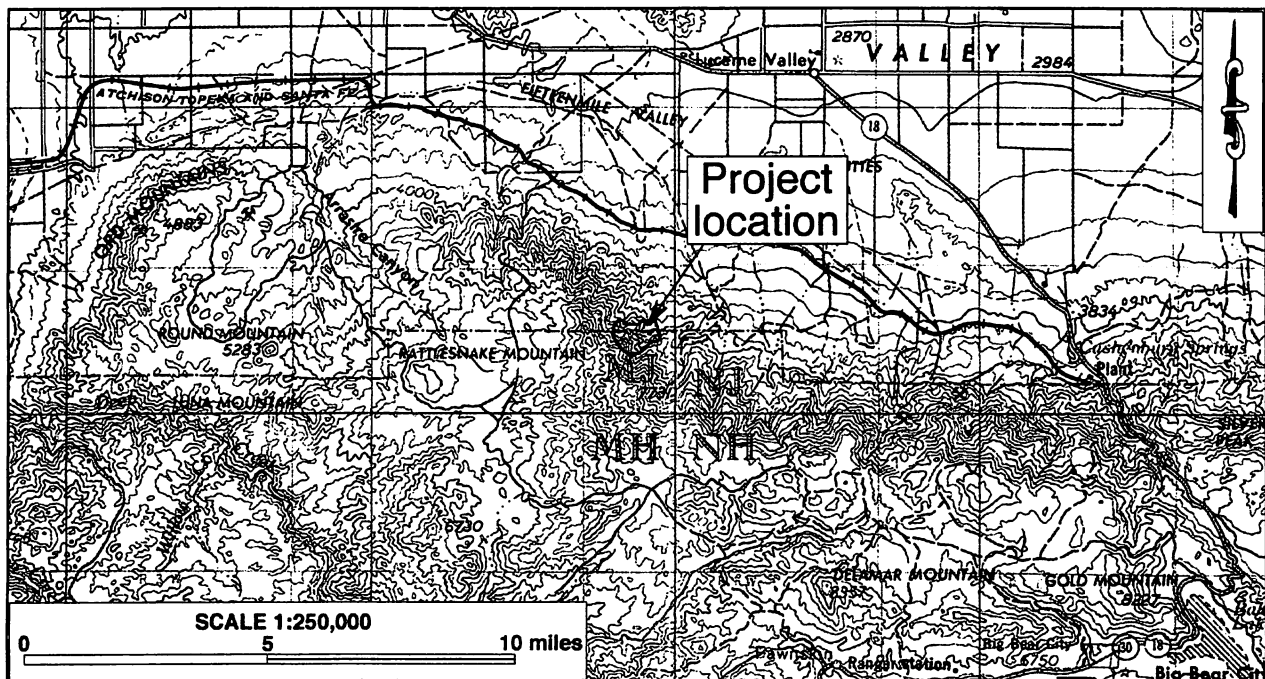


Figure 1. Project vicinity. (Based on USGS San Bernardino, Calif., 1:250,000 quadrangle [USGS 1969])



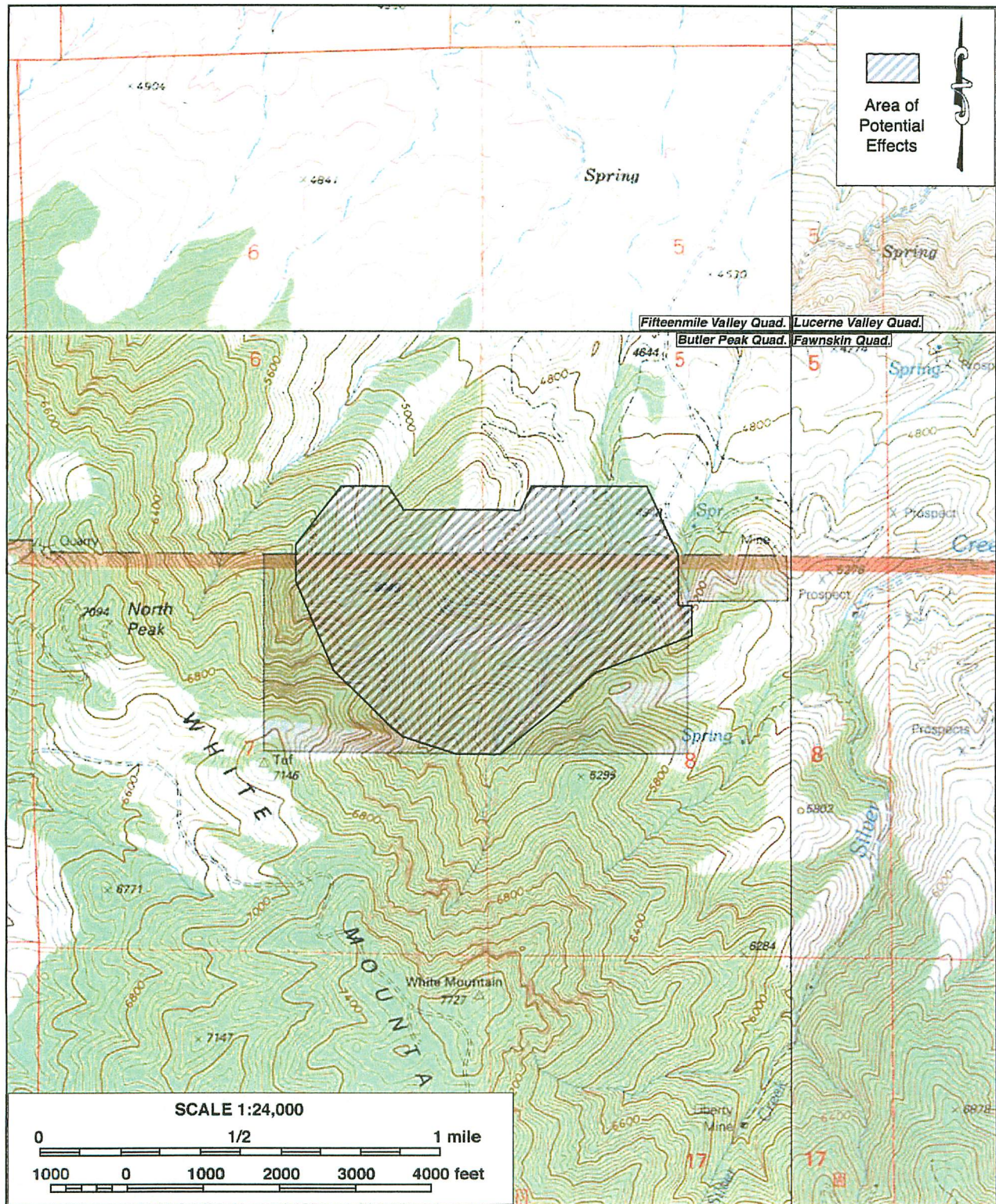


Figure 2. Area of Potential Effect. (Based on USGS Butler Peak, Fawnskin, Fifteenmile Valley, and Lucerne Valley, Calif., 1:24,000 quadrangles [USGS 1971; 1994; 1996a; 1996b])



effects on historic properties that may exist in or near the APE, as mandated by Section 106. In order to identify such historic properties, CRM TECH conducted a historical/archaeological resources records search, pursued historical background research on the APE, contacted Native American representatives, and carried out a systematic field survey. The following report is a complete account of the methods and results of the various avenues of research, and the final conclusion of the study.

## SETTING

### CURRENT NATURAL SETTING

The APE is located in the foothills of the San Bernardino Mountains, overlooking the Lucerne Valley and the Fifteenmile Valley on the southern rim of the Mojave Desert. The climate and environment of the area is typical of the high desert region, so-called because of its higher elevation than the Colorado Desert to the southeast. The climate is marked by extremes in temperature and aridity, with summer highs reaching well over 110°F and winter lows dipping below freezing. Average annual precipitation is less than five inches.

The APE lies approximately six miles south of State Highway 18 and five miles west of Crystal Creek Road. A large portion of the APE is currently in use by the existing quarry operations. The terrain is steep and rugged, with several large drainages north of the quarry. Elevations in the APE ranging around 4,850-6,600 feet above mean sea level. Large bedrock outcrops and boulders are found on the slopes and within some of the drainages. Vegetation observed within the APE includes Joshua trees, pines, oaks, cactus, chollas, tumbleweeds, junipers, Manzanita bushes, and various grasses and shrubs (Fig. 3).



Figure 3. Overview of the current natural setting of the APE. (Photo taken on October 2, 2008; view to the northeast)

## CULTURAL SETTING

### Prehistoric Context

In order to understand Native American cultures prior to European contact, archaeologists have devised chronological frameworks on the basis of artifacts and site types that go back some 12,000 years. Currently, the chronology most frequently applied in the Mojave Desert divides the region's prehistory into five periods marked by changes in archaeological remains, reflecting different ways in which Native peoples adapted to their surroundings. According to Warren (1984) and Warren and Crabtree (1986), the five periods are as follows: the Lake Mohave Period, 12,000 years to 7,000 years ago; the Pinto Period, 7,000 years to 4,000 years ago; the Gypsum Period, 4,000 years to 1,500 years ago; the Saratoga Springs Period, 1,500 years to 800 years ago; and the Protohistoric Period, 800 years ago to European contact.

This time frame is based on general changes in artifactual remains from large stone projectile points with few stones for grinding food products, to smaller projectile points with an increase in the number of milling stone tools. The scheme also notes increases in population, changes in food procurement and resource exploitation, and more cultural complexity over time. During the Protohistoric Period, there is evidence of contact with the Colorado River tribes and the introduction of pottery across the Mojave Desert.

### Ethnohistoric Context

The APE is located on the northern edge of the homeland of the Serrano Indians, whose traditional territory is centered at the San Bernardino Mountains but also includes the southern rim of the Mojave Desert, extending from Victorville eastward to Twenty-nine Palms. The name "Serrano" was derived from a Spanish term meaning "mountaineer" or "highlander." The basic written sources on Serrano culture are Kroeber (1925), Strong (1929), and Bean and Smith (1978). The following ethnographic discussion of the Serrano people is based on these sources.

Prior to European contact, the Serranos were primarily gatherers and hunters, and occasional fishers, who settled mostly where flowing water emerged from the mountains. They were loosely organized into exogamous clans, led by hereditary heads, and the clans, in turn, were affiliated with one of two exogamous moieties. The exact nature of the clans, their structure, function, and number are not known, except that each clan was the largest autonomous political and landholding unit, the core of which was the patrilineage. There was no pan-tribal political union among the clans.

Although contact with Europeans may have occurred as early as 1771 or 1772, Spanish influence on Serrano lifeways was negligible until 1819, when a mission *assistencia* was established on the southern edge of Serrano territory. Between then and the end of the mission era in 1834, most of the Serranos in the San Bernardino Mountains were removed to the nearby missions. At present, most Serrano descendants are found on the San Manuel and the Morongo Indian Reservations, where they participate in ceremonial and political affairs with other Native American groups on an inter-reservation basis.



## Historic Context

Situated far from the coastline and any of the major desert trails, the Lucerne Valley area saw little change during the Spanish and Mexican periods, although sporadic mining activities reportedly took place in the vicinity (Fife 1988:172). After the American annexation of Alta California in 1848, mining and prospecting in the area began in earnest, especially in the aftermath of gold discoveries in the San Bernardino Mountains in the early 1860s. As in the rest of the vast Mojave Desert, mining remained for a long time the dominant economic pursuit in the Lucerne Valley area, and since then has continued to the present time, yielding a diverse variety of mineral products ranging from gold to clay (*ibid.*:173, 175-176).

The mid-19th century mining boom in the vicinity brought to the Lucerne Valley area its earliest Euroamerican settlers. During the 1870s, "Uncle Pete" Davidson, a former prospector in the San Bernardino Mountains, established a homestead near Rabbit Springs, and became the first permanent resident in the valley (Stack 1984:26; Fife 1988:174). In the meantime, the miniature gold rush in the San Bernardino Mountains and later the construction of the Big Bear dam in 1883-1884 brought a steady flow of traffic along a wagon road through the valley, so much so that Davidson's ranch came to be known as "Davidson's Stage and Way Station" (Garret 1996:117). In 1897, James "Dad" Goulding, a silver miner from Colorado, acquired the Box S Ranch, which had been established in 1886 but since abandoned (Fife 1988:174; Anonymous n.d.:1). In the late 19th and early 20th centuries, Goulding played a pivotal role in the growth of the small community that he named Lucerne Valley, after the type of alfalfa grown by the Mormons (Goulding 1948:120).

Around the turn of the century, more homesteaders started to filter into the valley, especially after Goulding's discovery of artesian water in 1905 (Goulding 1948:118-119; Stack 1984:26). Over the next few decades, the settlers attempted a number of money-making schemes, such as cultivating deciduous fruits and alfalfa, raising chicken, turkeys, and rabbits, and even luring Hollywood movie-makers, in most cases with only short-lived success (Gobar 1969:213-217, 256-263; Stack 1984:27). After WWII, guest ranches sprouted up throughout the valley, offering city dwellers a brief relief from the pressures of urban life (Stack 1984:27). Throughout these various "fevers," however, growth remained relatively slow for the remote desert area, which has allowed it to retain much of its rural character to the present day.

## RESEARCH DESIGN

Scientific research should be directed by a theoretical orientation that is geared toward gathering data to answer questions of current research interest. While numerous theoretical orientations have been put forward and used to guide archaeological research and to improve data-collecting efforts, the cultural ecology approach still tends to be the most useful paradigm in archaeological endeavors, though it is often used in conjunction with newer models. Basically, the cultural ecology approach to understanding cultural development contends that people develop behavioral patterns in order to exploit the resources of the area by means of particular technologies. It also assumes that there is

interrelationship of these technologies, the environment, survival, and other aspects of the culture.

Since archaeology deals mostly with the cultural remains that are left long after the people are gone, this theoretical orientation has obvious advantages for archaeological research, although it is left to the archaeologist to determine the extent to which the behavior patterns used to exploit the environment affect other aspects of culture. Because of its continuing usefulness, the cultural ecology theoretical orientation is the basis of the archaeological investigation used in this study.

An archaeological investigation must also be guided by a thoughtful research design in order to contribute new insights to current knowledge and theory regarding the prehistory and/or history of a particular region by attempting to answer pertinent questions. While currently no overarching research design has been established for this part of the Mojave Desert, a standard set of research questions, or research domains, can be applied to archaeological investigations in the region, especially for Phase I studies such as this.

The primary goal of a Phase I archaeological investigation is to identify any prehistoric or historic-period cultural resources that may be present within the project area. This identification process includes a historical/archaeological resources records search, historical background research, Native American consultation, and a field inspection of the APE. While little detailed data may be available from the research methods employed during Phase I studies, some types of data gathered during the investigation may be used to address research issues, at least on a basic level. For instance, just the presence of cultural resources on a property indicates that people used the area. Other research questions, such as those posited below, can be addressed during Phase I studies only if certain types of artifacts or features are noted within or near the APE.

- *Is there any evidence that important events took place on the property or that the property is associated with a historically important person?*

Research may find that events that contribute to our cultural heritage or the broad patterns of California history may have occurred on the property or that the property is associated with a person who played an important role in our history. Physical evidence of past events or the roles that people played in history may or may not still be present on the property but there may be other records of the event or people.

- *Can we learn anything regarding the time period the area was used? Can we tell if people were using the area during early or late prehistoric times, or during the historic period?*

Some artifacts, both prehistoric and historic, can be linked to particular time periods. These types of artifacts, if present, could shed some light on the period of time when people were using the property. For instance, some projectile point types are correlated to particular periods. Styles of shell beads, pottery, historic-period artifacts, and buildings or building materials may indicate particular time periods of use.

- *Can we learn anything about the duration of the use of the land? Was the land used continuously for a long period of time, was it used only briefly, or was it used repeatedly over time?*

The density and types of artifacts, features, and structures that may be visible on the surface of the property during the Phase I survey may provide clues regarding the intensity and duration of the use of the area.

- *During a Phase I study, can we learn anything about the subsistence strategies of the people who used the land? Is there any evidence visible on the surface that indicates what food resources were being processed and/or consumed? Is there any evidence regarding the preparation of the food resources?*

Ethnographic and historical data provide information regarding the plants and animals that people used in prehistoric times, as well as how the foods were prepared. A review of natural plant community for the area would indicate whether any of those resources were present. Likewise, bedrock milling features and lithic debitage or projectile points indicate that gathering and hunting was occurring.

Similarly, some cans and bottles have distinctive shapes that allow for their identification regarding the type of food they contained, while evidence of agriculture would be obvious evidence of a subsistence strategy. Some structures or structural remains may also provide clues regarding economic pursuits that occurred on the subject property.

- *Would any of the information gathered during the Phase I study shed light on settlement patterns? Would we be able to relate activities in the project area with broader patterns of human habitation of the region? Could we tell if people lived on the subject property or if they lived somewhere else but used the resources on the property? If they lived on the property, was it a dense or sparse population? Does occupation of the subject property disclose any information regarding settlement strategies or preferences?*

The results of the records search and historic map review may reveal other settlements in the area. A review of pertinent literature might also provide insights regarding broad settlement patterns in the region. Some types of cultural remains on the property, such as midden soils and permanent structures, may offer important clues.

- *If there are features or structures on the property, are they somehow unique or special? Is there anything unusual about them?*

First of all, are they even more than 45 years old? The presence of man-made features or structures on the property means that they need to be examined for particular construction details that may make them important in their own right.

- *Can we learn anything about trade, travel, or cultural interactions?*

The presence of trails or roads would indicate that people were traveling across the property from one area to another. The presence of exotic goods such as stone or shell material, food containers, tools, clothing, and building materials from distant sources, would indicate trade, travel, and/or cultural interactions. Some artifacts (e.g., prehistoric water jars, wagon or automobile parts, and saddle fragments) and features (e.g., trails, wagon roads, and highways) would also indicate that people were traveling through the area.

While Phase I investigations typically can only determine the presence or absence of cultural resources on a property, some types of resources, if present, may provide basic, general information regarding the people who left the cultural remains behind. While the data gathered during the Phase I study may not be enough to contribute important new information to the understanding of the way people lived, it will help in determining the significance of the data or whether more research is needed.

## **RESEARCH METHODS**

### **RECORDS SEARCH**

On September 30, 2008, CRM TECH archaeologist Nina Gallardo (see App. 1 for qualifications) completed the records search at the Archaeological Information Center (AIC), San Bernardino County Museum, Redlands. During the records search, Gallardo checked the AIC's electronic database for previously identified historical/archaeological resources in or near the APE and existing cultural resources reports pertaining to the vicinity. Previously identified historical/archaeological resources include properties designated as California Historical Landmarks, Points of Historical Interest, or San Bernardino County Historical Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

### **HISTORICAL BACKGROUND RESEARCH**

Bai "Tom" Tang, CRM TECH historian (see App. 1 for qualifications), conducted the historical background research on the basis of published literature in local history and historic maps of the Lucerne Valley area. Among maps consulted for this study were the U.S. General Land Office's (GLO) land survey plat map dated 1896 and the U.S. Geological Survey's (USGS) topographic maps dated 1902, 1947, and 1956. These maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, located in Moreno Valley.

### **NATIVE AMERICAN PARTICIPATION**

As part of the research procedures, CRM TECH contacted the State of California's Native American Heritage Commission on September 22, 2008, to request a records search in the commission's sacred lands file. Following the commission's recommendations, CRM TECH further contacted a total of 11 Native American representatives in the region, both by mail and by telephone, between September 23 and October 29 to solicit local Native American input regarding any possible cultural resource concerns over the proposed undertaking. The correspondences between CRM TECH and the Native American representatives are attached to this report in Appendix 2.

### **FIELD SURVEY**

On October 2 and 3, 2008, CRM TECH field director Daniel Ballester and project archaeologists Robert Porter and Andrea Stella (see App. 1 for qualification) carried out the pedestrian field survey of the APE. The relatively level areas of the APE were surveyed

intensively by walking parallel north-south transects spaced 15 meters (approx. 50 feet) apart. Since such regular transects were impracticable on the steep slopes, the more rugged terrain in the APE was surveyed by inspecting all areas accessible or demonstrating the potential for archaeological remains, such as the drainages and bedrock outcrops. Previously surveyed portions of the APE, where mining operations are currently ongoing, were given a cursory survey. In this way, the entire APE was examined systematically for any evidence of human activities dating to the prehistoric or historic periods (i.e., 50 years ago or older). Ground visibility ranged from poor (25%) to fair (70%) depending upon the density of the vegetation.

## RESULTS AND FINDINGS

### RECORDS SEARCH

According to AIC records, portions of the APE were previously surveyed between 1985 and 1992 (Fig. 4), but no cultural resources had been recorded on or adjacent to the property. Outside the APE boundaries but within a one-mile radius, AIC records show at least four other previous studies on various tracts of land and linear features (Fig. 4). As a result of these and other similar studies in the vicinity, three archaeological sites were recorded within the scope of the records search, as listed in Table 1 (see App. 3 for site locations). None of these sites was found in the immediate vicinity of the APE, and thus none of them requires further consideration during this study.

Table 1. Previously Recorded Cultural Resources within the Scope of the Records Search		
Site No.	Recorded by/Date	Description
36-005319	Lerch 1985	Prehistoric roasting pit/hearth
36-005556	Lerch 1986; McCarthy 1988	Scatter of lithic flakes
36-006142	McCarthy 1988	Bedrock milling feature (metate)

### HISTORICAL BACKGROUND RESEARCH

Situated in the foothills on the edge of the sparsely populated Mojave Desert country, the APE exhibited no evidence of any settlement or development activities throughout the historic period (Figs. 5-7). Between the 1850s and the 1950s, the only man-made features noted in the vicinity of the APE were a few dirt roads across the barren landscape (Figs. 5-7). Based on these historic maps, the APE appears to be relatively low in sensitivity for cultural resources from the historic period.

### NATIVE AMERICAN PARTICIPATION

In response to CRM TECH's inquiry, the Native American Heritage Commission reports that the sacred lands record search identified no Native American cultural resources in the immediate project area. However, noting that "the absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any project area," the commission recommends that local Native American representatives be contacted for further information, and provided a list of potential contacts in the region (see App. 2).

This map has been removed for confidentiality purposes

Upon receiving the commission's response, CRM TECH initiated correspondence with all nine individuals on the referral list and the organizations they represent. In addition, John Gomez, Jr., Cultural Resources Coordinator for the Ramona Band of Cahuilla Indians, and John Tommy Rosas, Tribal Administrator of the Tongva Ancestral Territorial Tribal Nation, were also contacted. As of this time, four responses have been received (see App. 2).

In a letter dated September 27, 2008, Charles Wood, Chairman of the Chemehuevi Indian Tribe, states that the area in and around the APE is sensitive for Native American cultural resources. The tribe is specifically concerned with any areas around Chimney rock, which is approximately six miles to the north of the APE. The presence of village sites, petroglyphs, and geoglyphs in the area is also among the tribe's concerns. Primarily, the tribe is concerned with Native

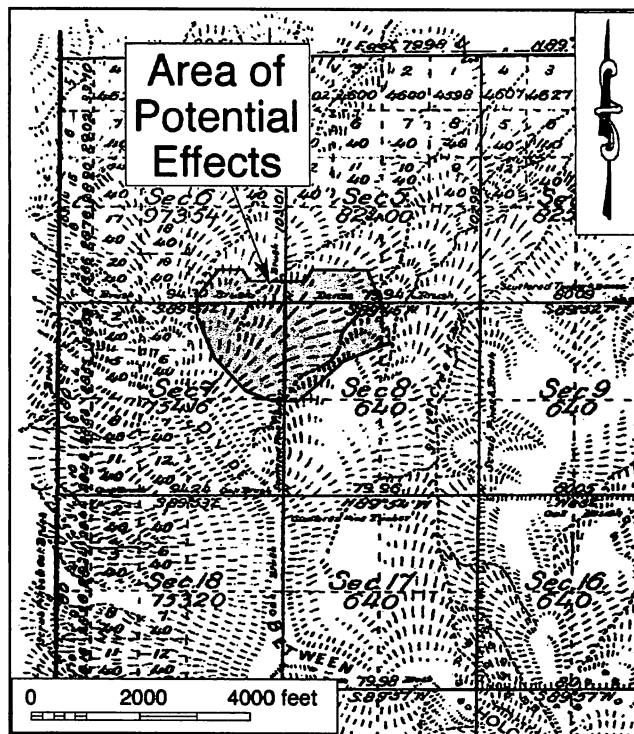


Figure 5. The APE and vicinity in 1855-1894.  
(Source: GLO 1896;)

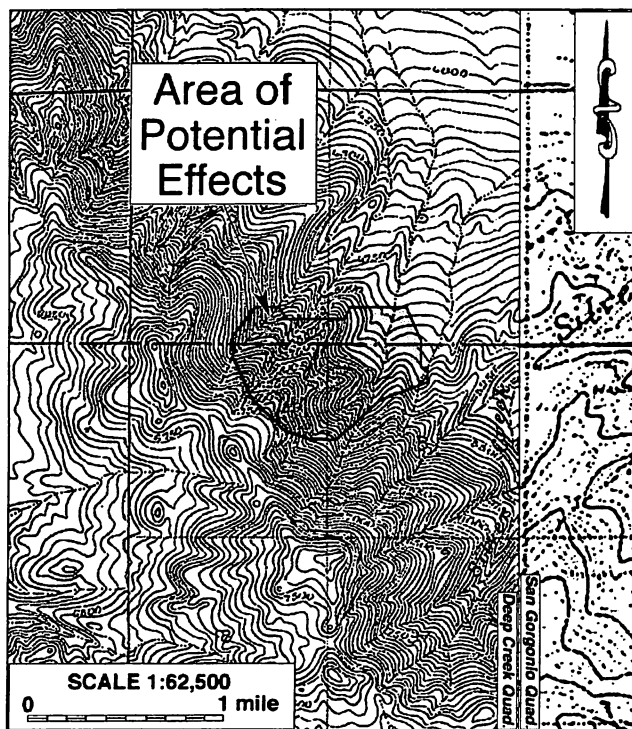


Figure 6. The APE and vicinity in 1898-1899.  
(Source: USGS 1902a; 1902b)

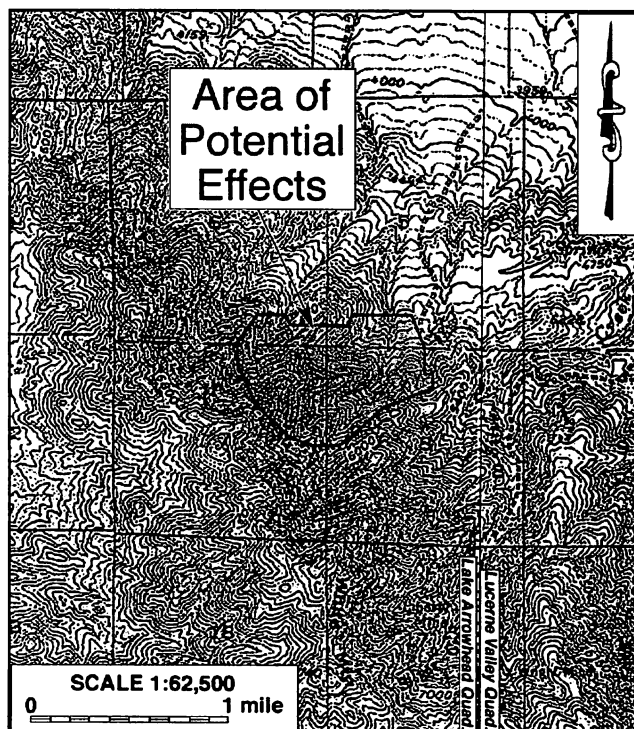


Figure 7. The APE and vicinity in 1945-1952.  
(Source: USGS 1947; 1956)

American artifacts, village sites, and human remains being discovered in the APE during the undertaking. In addition to requesting notification of any discovery of cultural resources in the APE, Mr. Wood requests that an aerial survey be conducted to identify any geoglyphs that may be present in the APE.

In e-mails dated October 2 and 24, 2008, John Tommy Rosas of the Tongva Ancestral Territorial Tribal Nation states that the APE lies within or in close proximity to a sacred site, in an area that is highly sensitive for unknown Native American cultural remain in buried deposits. He requests proper protection of the area through further consultation with the lead agency.

Michael Contreras, Cultural Heritage Program Manager for the Morongo Band of Mission Indians, replied by e-mail on October 15, 2008, stating that the tribe has no concerns at this time but wishes to be contacted regarding any archaeological discoveries. John Gomez, Jr., of the Ramona Band responded by telephone on October 28, and expressed the tribe's intention to defer to other Native American groups located closer to the APE.

## **FIELD SURVEY**

The intensive-level field survey produced completely negative results for potential cultural resources. The entire APE was closely inspected for any evidence of human activities dating to the prehistoric or historic periods, but none was found. Much of the APE has been disturbed by the ongoing mining activities and the construction of access roads, and large piles of quartz mining refuse are scattered throughout the area. No buildings, structures, objects, sites, features, or artifacts more than 50 years of age were encountered during the survey.

## **DISCUSSION**

The purpose of this study is to identify and evaluate any historic properties that may exist within or adjacent to the Area of Potential Effects of the proposed undertaking, and assess the undertaking's potential effects on such properties, if any. "Historic properties," as defined by the Advisory Council on Historic Preservation, include "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior" (36 CFR 800.16(l)). The eligibility for inclusion in the National Register is determined by applying the following criteria, developed by the National Park Service as per provision of the National Historic Preservation Act:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

- (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) that are associated with the lives of persons significant in our past; or
- (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic



values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or  
(d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

As discussed above, the records search, historical background research, and field survey for this study have all produced negative results, and no potential "historic properties" were encountered within or adjacent to the APE. However, one of the Native American representatives contacted by CRM TECH, John Tommy Rosas of the Tongva Ancestral Territorial Tribal Nation, reports that the APE lies within or in close proximity to a sacred site, which may qualify as a site of traditional cultural value if properly identified and documented.

At this time, Mr. Rosas has not disclosed the exact location, nature, or other attributes of the sacred site to CRM TECH, but intends to seek proper protection of the site through formal consultation with the lead agency for the proposed undertaking, namely the BLM. Prior to the completion of the formal consultation, it cannot be determined whether any "historic properties" may be affected by the proposed undertaking.

## CONCLUSION AND RECOMMENDATIONS

The foregoing report has provided background information on the Area of Potential Effects, outlined the methods used in the current study, and presented the results of the various avenues of research. Throughout the course of the study, no "historic properties," as defined by Section 106 regulations, were encountered within or adjacent to the APE. However, Native American input during this study suggests that the APE lies within or in close proximity to a potential site of traditional cultural value. Based on these findings, CRM TECH presents to the BLM the following recommendations regarding the proposed undertaking:

- The BLM should initiate formal government-to-government consultation with the Tongva Ancestral Territorial Tribal Nation for additional information on the site of Native American cultural concern in order to determine whether it qualifies as a "historic property," as defined by Section 106 regulations, and whether the proposed undertaking will have an effect on the site.
- No other cultural resources investigation is necessary for the proposed undertaking unless project plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are discovered during any earth-moving operations associated with the undertaking, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

## REFERENCES

Anonymous

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1988 Mineral Wealth of Lucerne Valley. *California Geology* August:171-177.

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1996 *San Bernardino County Place Names*. Limited printing by the author. On file, California Room, Norman Feldheim Public Library, San Bernardino.

GLO (General Land Office, U.S. Department of the Interior)

1896 Plat Map: Township No. 3 North Range No. 1 West, San Bernardino Meridian; surveyed in 1855-1894.

Gobar, Julian Smith

1969 *Raising the Dust*. J. S. Gobar Foundation, St. George, Utah.

Goulding, James E.

1948 The Founding of a Mojave Desert Community; transcribed by Martha A. Chickering. *California Historical Society Quarterly* 27(2):113-122.

Kroeber, Alfred L.

1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Government Printing Office, Washington, D.C.

Stack, Richard P.

1984 History of Our Valley. In *Beautiful, Beautiful Lucerne Valley*, compiled by the Lucerne Valley Chamber of Commerce; pp. 26-27.

Strong, William Duncan

1929 *Aboriginal Society in Southern California*. University of California Publications in American Archaeology and Ethnology, Vol. 26. Reprinted by Malki Museum Press, Banning, California, 1972.

USGS (United States Geological Survey, U.S. Department of the Interior)

1902a Map: Deep Creek, Calif. (15', 1:62,500); surveyed in 1898-1900.

1902b Map: San Geronio, Calif. (30', 1:125,000); surveyed in 1899.

1947 Map: Lucerne Valley, Calif. (15', 1:62,500); aerial photographs taken in 1945

1956 Map: Lake Arrowhead, Calif. (15', 1:62,500); aerial photographs taken in 1952.

1969 Map: San Bernardino, Calif. (1:250,000); 1958 edition revised.

1971 Map: Fifteenmile Valley, Calif. (7.5', 1:24,000); aerial photographs taken in 1969, field-checked in 1971.

1994 Map: Lucerne Valley, Calif. (7.5', 1:24,000); 1971 edition photorevised in 1994.

1996a Map: Butler Peak, Calif. (7.5', 1:24,000); 1971 edition photorevised in 1994.

1996b Map: Fawnskin, Calif. (7.5', 1:24,000); 1971 edition photorevised in 1994.

Warren, Claude N.

1984 The Desert Region. In Michael J. Moratto (ed.): *California Archaeology*; pp. 339-430. Academic Press, Orlando, Florida.

Warren, Claude N., and Robert H. Crabtree

1986 Prehistory of the Southwestern Area. In Warren L. D'Azevedo (ed.): *Handbook of North American Indians*, Vol. 11: *Great Basin*; pp. 183-193. Smithsonian Institution, Washington, D.C.

**APPENDIX 1**

**PERSONNEL QUALIFICATIONS**

## **PRINCIPAL INVESTIGATOR/HISTORIAN**

**Bai "Tom" Tang, M.A.**

### **Education**

- 1988-1993 Graduate Program in Public History / Historic Preservation, UC Riverside.  
1987 M.A., American History, Yale University, New Haven, Connecticut.  
1982 B.A., History, Northwestern University, Xi'an, China.
- 2000 "Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.  
1994 "Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

### **Professional Experience**

- 2002- Principal Investigator, CRM TECH, Riverside/Colton, California.  
1993-2002 Project Historian/ Architectural Historian, CRM TECH, Riverside, California.  
1993-1997 Project Historian, Greenwood and Associates, Pacific Palisades, California.  
1991-1993 Project Historian, Archaeological Research Unit, UC Riverside.  
1990 Intern Researcher, California State Office of Historic Preservation, Sacramento.  
1990-1992 Teaching Assistant, History of Modern World, UC Riverside.  
1988-1993 Research Assistant, American Social History, UC Riverside.  
1985-1988 Research Assistant, Modern Chinese History, Yale University.  
1985-1986 Teaching Assistant, Modern Chinese History, Yale University.  
1982-1985 Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

### **Honors and Awards**

- 1988-1990 University of California Graduate Fellowship, UC Riverside.  
1985-1987 Yale University Fellowship, Yale University Graduate School.  
1980, 1981 President's Honor List, Northwestern University, Xi'an, China.

### **Cultural Resources Management Reports**

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (With Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

### **Membership**

California Preservation Foundation.

## **PRINCIPAL INVESTIGATOR/ARCHAEOLOGIST**

**Michael Hogan, Ph.D., RPA\***

### **Education**

- 1991 Ph.D., Anthropology, University of California, Riverside.
- 1981 B.S., Anthropology, University of California, Riverside; with honors.
- 1980-1981 Education Abroad Program, Lima, Peru.
  
- 2002 Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
- 2002 "Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
- 2002 "Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
- 1992 "Southern California Ceramics Workshop," presented by Jerry Schaefer.
- 1992 "Historic Artifact Workshop," presented by Anne Duffield-Stoll.

### **Professional Experience**

- 2002- Principal Investigator, CRM TECH, Riverside/Colton, California.
- 1999-2002 Project Archaeologist/Field Director, CRM TECH, Riverside.
- 1996-1998 Project Director and Ethnographer, Statistical Research, Inc., Redlands.
- 1992-1998 Assistant Research Anthropologist, University of California, Riverside
- 1992-1995 Project Director, Archaeological Research Unit, U. C. Riverside.
- 1993-1994 Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
- 1991-1992 Crew Chief, Archaeological Research Unit, U. C. Riverside.
- 1984-1998 Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

### **Research Interests**

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

### **Cultural Resources Management Reports**

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

### **Memberships**

\* Register of Professional Archaeologists.  
Society for American Archaeology.  
Society for California Archaeology.  
Pacific Coast Archaeological Society.  
Coachella Valley Archaeological Society.

**PROJECT ARCHAEOLOGIST/REPORT WRITER**  
**Deirdre Encarnación, M.A.**

**Education**

2003 M.A., Anthropology, San Diego State University, California.  
2000 B.A., Anthropology, minor in Biology, with honors; San Diego State University, California.  
1993 A.A., Communications, Nassau Community College, Garden City, N.Y.  
  
2001 Archaeological Field School, San Diego State University.  
2000 Archaeological Field School, San Diego State University.

**Professional Experience**

2004- Project Archaeologist/Report Writer, CRM TECH, Riverside/Colton, California.  
2001-2003 Part-time Lecturer, San Diego State University, California.  
2001 Research Assistant for Dr. Lynn Gamble, San Diego State University.  
2001 Archaeological Collection Catalog, SDSU Foundation.

**PROJECT ARCHAEOLOGIST**  
**Nina Gallardo, B.A.**

**Education**

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

**Professional Experience**

2004- Project Archaeologist, CRM TECH, Riverside/Colton, California.

**Honors and Awards**

2000-2002 Dean's Honors List, University of California, Riverside.

**PROJECT ARCHAEOLOGIST**  
**Andrea Stella, B.S.**

**Education**

2003 B.S., Anthropology, University of California, Riverside.

**Professional Experience**

2002- Project Archaeologist, CRM TECH, Riverside/Colton, California.

## **PROJECT ARCHAEOLOGIST/FIELD DIRECTOR**

**Daniel Ballester, B.A.**

### **Education**

- 1998 B.A., Anthropology, California State University, San Bernardino.  
1997 Archaeological Field School, University of Las Vegas and University of California, Riverside.  
1994 University of Puerto Rico, Rio Piedras, Puerto Rico.  
2007 Certificate in Geographic Information Systems (GIS), California State University, San Bernardino.  
2002 "Historic Archaeology Workshop," presented by Richard Norwood, Base Archaeologist, Edwards Air Force Base; presented at CRM TECH, Riverside, California.

### **Professional Experience**

- 2002- Field Director, CRM TECH, Riverside/Colton, California.  
1999-2002 Project Archaeologist, CRM TECH, Riverside, California.  
1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.  
1998 Field Crew, A.S.M. Affiliates, Encinitas, California.  
1998 Field Crew, Archaeological Research Unit, University of California, Riverside.

## **PROJECT ARCHAEOLOGIST**

**Robert Allen Porter, B.A.**

### **Education**

- 2000 B.A., Anthropology, California State University, San Bernardino.

### **Professional Experience**

- 2001- Project Archaeologist, CRM TECH, Riverside/Colton, California.  
2000 Archaeological field class under the direction of Claude Warren. Excavated units at Soda Lake in the Mojave Desert and produced lake bottom stratigraphic profiles and carbon sample collections.

### **Honors and Awards**

- Spring 2000 Dean's Honors List (G.P.A. of 4.0 in 15 units).  
Fall 2000 Dean's Honors List (G.P.A. of 3.9 in 12 units).

**APPENDIX 2**

**CORRESPONDENCE WITH  
NATIVE AMERICAN REPRESENTATIVES\***

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\*A total of 11 local Native American representatives were contacted; a sample letter is included in this report.





**CRM TECH**  
**FAX COVER**  
**SHEET**

1016 E. Cooley Drive  
Suite B  
Colton, CA 92324  
909-824-6400 • Tel  
909-824-6405 • Fax

To:

Native American  
Heritage Commission

Fax:

(916) 657-5390

From:

Nina Gallardo

Date:

September 22, 2008

Number of pages (including this  
cover sheet):

2

**HARDCOPY:**

       will follow by mail

  ✓   will not follow unless  
requested

RE: Sacred Land records search

This is to request a Sacred Lands records search

**Name of project:**

White Knob Quarry Revision Project  
CRM TECH #2280A (White Knob Expansion)

**Project size:**

300 acres

**Location:**

White Knob, near Lucerne Valley  
San Bernardino County

**USGS 7.5' quad sheet data:**

Butler Peak, Calif.,  
Fifteenmile Valley, Calif.,  
Fawnskin, Calif.,  
Lucerne Valley, Calif.  
Sections 5, 6, 7 & 8, T3N R1W, SBBM

Please call if you need more information or have any  
questions.

Results may be faxed to the number above.

I appreciate your assistance in this matter.

Map included

STATE OF CALIFORNIA

Arnold Schwarzenegger, Governor

**NATIVE AMERICAN HERITAGE COMMISSION**

915 CAPITOL MALL, ROOM 964  
SACRAMENTO, CA 95814  
(916) 653-6251  
Fax (916) 657-5390  
Web Site [www.nahc.ca.gov](http://www.nahc.ca.gov)  
e-mail: [ds\\_nahc@pacbell.net](mailto:ds_nahc@pacbell.net)



September 23, 2008

Ms. Nina Gallardo, RPA

**CRM TECH**

1016 E. Cooley Drive, Suite B  
Colton, CA 92324

Sent by FAX to: 909-824-6405

No. of Pages: 3

Re: Request for a Sacred Lands File records search and Native American Contacts list for the proposed White Knob Quarry Revision Project (CRM TECH #2280A); located near Lucerne Valley; San Bernardino County, California

Dear Ms. Gallardo:

The Native American Heritage Commission was able to perform a record search of its Sacred Lands File (SLF) for the affected project area/area of potential effect (APE). The SLF failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any project area.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed are the names of culturally-affiliated Native American Contacts that may have knowledge of cultural resources in the project area. A list of Native American contacts is attached to assist you. It is advisable to contact the persons listed; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area. A local tribe or Native American individual may be the only source of a Native American cultural resource.

Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 15064.5(f) and Section 15097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Discussion of these should be included in your environmental documents, as appropriate.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

  
Dave Singleton, Program Analyst

Attachment: Native American Contact List

**Native American Contacts**  
**San Bernardino County**  
**September 23, 2008**

**Ramona Band of Cahuilla Mission Indians**  
**Joseph Hamilton, Chairman**  
**P.O. Box 391670**                      **Cahuilla**  
**Anza**                      , **CA 92539**  
**admin@ramonatribe.com**  
**(951) 763-4105**  
**(951) 763-4325 Fax**

**San Manuel Band of Mission Indians**  
**James Ramos, Chairperson**  
**26569 Community Center Drive**                      **Serrano**  
**Highland**                      , **CA 92346**  
**(909) 864-8933**  
**(909) 864-3724 - FAX**  
**(909) 864-3370 Fax**

**Chemehuevi Reservation**  
**Charles Wood, Chairperson**  
**P.O. Box 1976**                      **Chemehuevi**  
**Chemehuevi Valley**                      , **CA 92363**  
**chemehuevit@yahoo.com**  
**(760) 858-4301**  
**(760) 858-5400 Fax**

**Fort Mojave Indian Tribe**  
**Tim Williams, Chairperson**  
**500 Merriman Ave**                      **Mojave**  
**Needles**                      , **CA 92363**  
**(760) 629-4591**  
**(760) 629-5767 Fax**

**San Fernando Band of Mission Indians**  
**John Valenzuela, Chairperson**  
**P.O. Box 221838**                      **Fernandeño**  
**Newhall**                      , **CA 91322**                      **Tataviam**  
**tsen2u@msn.com**                      **Serrano**  
**(661) 753-9833 Office**                      **Vanyume**  
**(760) 885-0955 Cell**                      **Kitanemuk**  
**(760) 949-1604 Fax**

**AhaMaKav Cultural Society, Fort Mojave Indian Tribe**  
**Linda Otero, Director**  
**P.O. Box 5990**                      **Mojave**  
**Mohave Valley**                      , **AZ 86440**  
**ahamakav@citlink.net**  
**(928) 768-4475**  
**(928) 768-7996 Fax**

**Morongo Band of Mission Indians**  
**Michael Contreras, Cultural Heritage Prog. Manager**  
**13000 Fields Road**                      **Cahuilla**  
**Banning**                      , **CA 92220**                      **Serrano**  
**(951) 755-5025**  
**(951) 201-1866 - cell**  
**(951) 922-0105 Fax**

**San Manuel Band of Mission Indians**  
**Ann Brierty, Environmental Department**  
**101 Pure Water Lane**                      **Serrano**  
**Highland**                      , **CA 92346**  
**abrierty@sanmanuel-nsn.gov**  
**(909) 863-5899 EXT-4321**  
  
**(909) 862-5152 Fax**

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed White Knob Quarry Revision Project (CRM TECH#2280A) located in White Knob, near the Lucerne Valley; San Bernardino County, California for which a Sacred Lands File search and Native American Contacts list were requested.

**Native American Contacts**  
**San Bernardino County**  
**September 23, 2008**

Serrano Nation of Indians  
Goldie Walker  
6588 Valeria Drive  
Highland , CA 92346  
(909) 862-9883

Serrano

**This list is current only as of the date of this document.**

**Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.**

**This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed White Knob Quarry Revision Project (CRM TECH#2280A) located in White Knob, near the Lucerne Valley; San Bernardino County, California for which a Sacred Lands File search and Native American Contacts list were requested.**

September 23, 2008

Charles Wood, Chairperson  
Chemehuevi Reservation  
P. O. Box 1976  
Chemehuevi Valley, CA 92363

RE: White Knob Quarry Revision Project  
Near Lucerne Valley, San Bernardino County  
CRM TECH Contract #2280A

Dear Mr. Wood:

As part of a cultural resources study for the project referenced above, I am writing to request your input on potential Native American cultural resources on/in or near the Area of Potential Effects (APE). Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value within or near the APE. The lead agency for this project is the U.S. Bureau of Land Management for Section 106-compliance purposes.

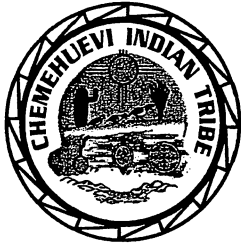
The undertaking, located near Lucerne Valley, San Bernardino County, involves the expansion of the existing 145-acre White Knob quarry site to approximately 300 acres. The accompanying map, based on the USGS Butler Peak, Fawnskin, Fifteenmile Valley, and Lucerne Valley, Calif., 7.5' quadrangles, depicts the location of the APE in the Sections 5, 6, 7, and 8, T3N R1W, SBBM.

Any information, concerns or recommendations regarding cultural resources in the vicinity of the APE may be forwarded to CRM TECH by telephone, e-mail, facsimile or standard mail. Thank you for the time and effort in addressing this important matter.

Respectfully,

Laura Hensley Shaker  
CRM TECH

Encl.: APE map



## *Chemehuevi Indian Tribe*

P. O. Box 1976 • HAVASU LAKE, CA 92363 • (760) 858-4219 • FAX: (760) 858-5400

September 27, 2008

Laura Hensley Shaker  
CRM TECH  
1016 E. Cooley Drive, Suites A/B  
Colton, CA 92324

RE: White Knob Quarry Revision Project

Ms. Shaker:

From the map provided I can not tell how far this APE is from Chimney Rock. As referenced below we have concerns about the area of Chimney Rock specifically and of the whole area in general.

The Chemehuevi have a long and well documented history in the desert areas of southern California, southern Nevada, and northern and western Arizona. In fact, we would have originally considered all of San Bernardino County and parts of Riverside, Kern and Inyo Counties as our ancestral, historical homeland. We also considered parts of southern Nevada and western Arizona as within our homeland territories. In the late 1800's the vast majority of this area was declared public domain by the US Federal Government and the various Tribes that had traditionally used this land on an intimate, daily basis lost the ability to freely use it as their ancestors once had. The Chemehuevi were just one of several nations of people whose ancestors freely used the area in question.

At one time we would have called the area between the Tehachapi Mountains to the Colorado River and from Death Valley to nearly Yuma, AZ as our ancestral territory. In addition, we would claim from Ash Meadows and the Pahrump area through Las Vegas and into the Muddy and Virgin Rivers area and on into the Valley of Fire.

The particular area that you speak of is of the utmost importance to the Chemehuevi. I only bring the following facts to your attention to show the obvious ancestral, historical presence of the Chemehuevi Indians in the greater area between Hesperia/Victorville and Barstow.

All along the length of the Mojave River are found areas of cultural resources; there may be burial sites, camp sites, 'sleeping circles' and village sites. This was a major

residential and trade route in ancient times of my people between the coast and the Colorado River areas.

There are petroglyphs scattered across a wide swath of the Mohave and Colorado Deserts. In a publication titled, "Native American Rock Art at Ft. Irwin" distributed in both the Ft. Irwin Archaeology Center and the Mojave River Valley Museum in Barstow, the author states, "*Most likely, the Chemehuevi or Kawaiisu lived at Ft. Irwin*".

Also in, "Native American Rock Art at Ft. Irwin" the author states, "*The Fort Irwin petroglyphs dated by archaeologists so – far, however, are not the oldest examples of rock art in the Mojave Desert. Petroglyphs have been found in the Barstow area that are 12,000 years old, while examples at China Lake date to 19,000 years ago*".

There are also known geoglyphs in the area; many that may not be recognizable from ground level. For that reason I would request that an aerial survey be done of the area.

In a census conducted in the late 1800's of the Victor area (later to become Victorville) there were found 44 Indians. Of that group, 37 were Chemehuevi and 7 were Desert Kawaiisu. In fact, we have a picture taken of two Chemehuevi women and a child in their campground living near Victor in 1898. One of the women has been identified as Maria Chapula, a renowned Chemehuevi basket maker, who was born in Victor in 1856 and who lived there until her death in 1960 at the age of 104 years. This was most likely the ancient village site of Atongiabit.

In the mid 1800's three cowboys were killed by Chemehuevis on what is today 'The Las Flores Ranch' in Hesperia. This was the ancient village site of Guapiabit. This incident later led to the 'Chimney Rock Massacre' in the Lucerne Valley involving up to 200 Chemehuevi.

Several burials were un-earthed at the old 'Lane's Crossing' near what is today Oro Grande. I believe this was the ancient village site of Topiabit.

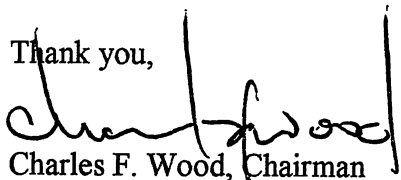
There is the recognized Chemehuevi Cemetery near Zzyzx.

I believe there were approximately nine (9) large permanent village sites along the Mojave River between the Narrows and the city of Barstow. Some of their names are as follows: Muscumbiabit, Guapiabit, Atongiabit, Najayabit, Guapian, Apiambit, Apiagma, Topiabit and Guaspect.

The question is not if there are artifacts or human remains, but where and when will they be found. I respectfully request notification if artifacts or human remains are found so we might consider repatriation.

While we no longer have intimate daily contact with the specific area in question we do have grave concerns, but we would not oppose the project as presented.

Thank you,



Charles F. Wood, Chairman  
Chemehuevi Indian Tribe



**From:** Johntommy Rosas <tattnlaw@gmail.com>  
**Date:** Wed, 1 Oct 2008 15:54:38 -0700  
**To:** <lshaker@crmtech.us>  
**Subject:** Re: CRM TECH project 2280

Hi Laura,

This area is a old/current sacred site and will be documented, I will send my doc on it later, ASAP, this area is also sensitive due to known surface and below grade cultural items, so the lead agency and applicant, feds or maybe NPS and other authorities need to secure and protect it, including from other [Indians?] who may be trespassing on our sacred site, this is a very critical area to protect, I will send TATTN names for the areas and villages,

Thanks

John Tommy/ 310 570- 6567 direct cell

since this is 106 TC, I will need the fed contact person also.

=====  
**From:** Mike Contreras <Mike\_Contreras@morongo.org>  
**Date:** Wed, 15 Oct 2008 15:41:15 -0700  
**To:** Laura Shaker <lshaker@crmtech.us>  
**Subject:** RE: CRMTECH # 2280, White Knob Quarry Expansion project

Very good. Thank you for contacting me on this. We will submit no concern at this time, and we would like to be contacted should there be any discoveries.

Michael Contreras Jr.  
Morongo Band of Mission Indians  
Cultural Heritage Program Coordinator  
951-755-5025 Office  
951-201-1866 Cell

=====  
**From:** Johntommy Rosas <tattnlaw@gmail.com>  
**Date:** Fri, 24 Oct 2008 08:56:18 -0700  
**To:** Laura Shaker <lshaker@crmtech.us>  
**Subject:** Re: <no subject>

HI , THAT WHITE KNOB SITE IS A SACRED SITE AND WE NEED TO DO TRIBAL CONSULTATION UNDER, 106 SEC NHPA, AND SEC 7 NEPA,[ESA]. WE HAVE SIGNIFICANT SITES UP THERE AND IT NEEDS TO BE STUDIED AND TC, SO LET ME KNOW WHAT THE PLAN AND RESPONSES , THANKS JOHNTOMMY

# TELEPHONE LOG

Name	Tribe/Affiliation	Telephone Contacts	Comments
Charles Wood, Chairperson	Chemehuevi Indian Tribe	None	Mr. Wood responded in a letter dated September 27, 2008 (copy attached).
Linda Otero, Director	Fort Mojave Indian Tribe (AhaMaKav Cultural Society)	4:05 pm, October 28, 2008 2:45 pm, October 29, 2008	Left messages; no response to date.
Tim Williams, Chairmperson	Fort Mojave Indian Tribe	3:40 pm, October 28, 2008 4:30 pm, October 29, 2008	Left messages; no response to date.
Mike Contreras, Jr., Cultural Heritage Project Manager	Morongo Band of Mission Indians	None	Mr. Contreras responded by e-mail on October 15, 2008 (copy attached).
Joseph Hamilton, Chairman	Ramona Band of Mission Indians	None	John Gomez, Jr., is the designated spokesperson for the tribe (see below).
John Gomez, Jr., Cultural Resources Coordinator	Ramona Band of Mission Indians	4:15 pm, October 28, 2008	The Ramona Band wishes to defer to other tribes located closer to the APE.
John Valenzuela, Chairperson	San Fernando Band of Mission Indians	4:08 pm, October 28, 2008 2:40 pm, October 29, 2008	Mr. Valenzuela wishes to be notified if anything were found in the APE.
James Ramos, Chairperson	San Manuel Band of Mission Indians	None	Ann Brierty is the designated spokesperson for the tribe (see below).
Ann Brierty, Cultural Resources Field Manager	San Manuel Band of Mission Indians	4:00 pm, October 28, 2008 2:47 pm, October 29, 2008	Left messages; no response to date.
Goldie Walker	Serrano Nation of Indians	4:17 pm, October 28, 2008 3:00 pm, October 29, 2008	No answer.
John Tommy Rosas, Tribal Administrator	Tongva Ancestral Territorial Tribal Nation	None	Mr. Rosas responded by e- mail on October 1 and 24, 2008 (copies attached).

**APPENDIX 3**

**LOCATIONS OF RECORDED SITES IN THE VICINITY**

**(Confidential)**

This map has been removed for confidentiality purposes

**PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT**

**WHITE KNOB QUARRY REVISION PROJECT**

**Amendment to Reclamation Plan No. 86M-04  
Lucerne Valley Area, San Bernardino County, California**

**For Submittal to:**

County of San Bernardino  
Land Use Services Department  
385 N. Arrowhead Avenue, Third Floor  
San Bernardino, CA 92415

Bureau of Land Management  
Barstow Field Office  
2601 Barstow Road  
Barstow, CA 92311

**Prepared for:**

George A. Webber, President  
Webber and Webber Mining Consultants, Inc.  
101 East Redlands Boulevard, Suite 240  
Redlands, CA 92373

**Prepared by:**

Harry M. Quinn, Paleontologist/Geologist  
Clarence Bodmer, Report Writer  
CRM TECH  
1016 East Cooley Drive, Suite A/B  
Colton, CA 92324

Michael Hogan, Principal Investigator  
Bai "Tom" Tang, Principal Investigator

March 9, 2009

CRM TECH Contract #2280P  
Approximately 298 Acres  
USGS Butler Peak, Calif., 7.5' (1:24,000) Quadrangle  
Sections 5-8, T3N R1W, San Bernardino Base Meridian  
BLM Cultural Resources Use Permit No. CA-07-12  
Fieldwork Authorization No. FA-680-09-06

## MANAGEMENT SUMMARY

Between September and November 2008, at the request of Webber and Webber Mining Consultants, Inc., CRM TECH performed a paleontological resource assessment on approximately 298 acres of vacant land, including an existing quarry, in an unincorporated area near the community of Lucerne Valley, San Bernardino County, California. The study is a part of the environmental review process for a proposed amendment to Reclamation Plan No. 86M-04, which would increase the area authorized for the White Knob-White Ridge Limestone Mine operated by OMYA California, Inc., under permit by the County of San Bernardino and the U.S. Bureau of Land Management (BLM).

The area of potential effects (APE) for the proposed project is located on Assessor's Parcel Nos. 446-011-04, -05, and -06 and 446-021-11 and -35, within Sections 5-8 of T3N R1W, San Bernardino Base Meridian, as depicted in the USGS Butler Peak, Calif., 7.5' quadrangle. A total 47.5 acres of the APE consists of U.S. government land under the jurisdiction of the BLM. The purpose of the present study is to provide the County of San Bernardino and the BLM with the necessary information and analysis to determine whether the proposed project would potentially disrupt or adversely affect any paleontological resources, and to design a paleontological salvage program for the project, if it becomes necessary.

In order to identify any paleontological resource localities that may exist in or near the APE and to assess the possibility for such resources to be encountered in future excavation and construction activities associated with the proposed project, CRM TECH initiated records searches at the San Bernardino County Museum and the Natural History Museum of Los Angeles County, conducted a literature search, consulted with OMYA California's geologist, and carried out a systematic field survey of the entire APE, in accordance with the guidelines of the Society of Vertebrate Paleontology.

Based on the results of these research procedures, the project's potential to impact significant nonrenewable paleontological resources appears to range from very low to indeterminate, depending upon the type of rock encountered during mining operations. The surficial deposits of older Quaternary alluvium, the Paleozoic metamorphic rocks, and the Mesozoic plutonic igneous rocks are considered to have a very low potential for containing significant nonrenewable paleontological remains. Therefore, no paleontological monitoring of earth-moving activities is recommended within the alluvial soils, the highly metamorphosed rock, or the igneous rock anywhere within the APE.

The Monte Cristo Limestone Formation, generally located in the central portion of the APE and not within BLM land, also has a very low potential to contain significant nonrenewable paleontological resources because of the metamorphic processes that have altered the limestone into marble. However, if small pockets of limestone exist within this formation that did not become completely metamorphosed into marble, then there is an indeterminate potential for the presence of nonrenewable fossil vertebrate and invertebrate remains of late Paleozoic age. Therefore, CRM TECH recommends that any non-metamorphosed fossiliferous limestone material found during mining operations, which might otherwise be discarded, be set it aside for examination by a qualified paleontologist before it is processed. Once a substantial collection is accumulated, a qualified paleontologist should be notified and the material should be visually inspected. In conjunction with the inspections, a program to mitigate impacts to paleontological resources that may be unearthed should be implemented.

Apparently there is virtually none of the carbonate rock that makes up the Monte Cristo Limestone Formation on BLM land. Thus, the potential for significant paleontological resources to be found on BLM land is even lower than in the quarry area itself.

## TABLE OF CONTENTS

MANAGEMENT SUMMARY .....	i
INTRODUCTION .....	1
PALEONTOLOGICAL RESOURCES .....	3
Definition .....	3
Significance Criteria .....	3
Paleontological Sensitivity .....	4
ENVIRONMENTAL SETTING.....	5
Geologic Setting.....	5
Current Natural Setting .....	6
METHODS AND PROCEDURES.....	6
Record Searches.....	6
Literature Review .....	7
Field Survey .....	7
RESULTS AND FINDINGS.....	7
Records Searches .....	7
Literature Review .....	8
Field Survey .....	11
DISCUSSION.....	12
CONCLUSION AND RECOMMENDATIONS .....	12
REFERENCES.....	14
APPENDIX 1: PERSONNEL QUALIFICATIONS .....	17
APPENDIX 2: RECORDS SEARCHES RESULTS .....	21

## LIST OF FIGURES

Figure 1. Project vicinity .....	1
Figure 2. The area of potential effects.....	2
Figure 3. Typical landscapes within the APE .....	6
Figure 4. Geologic formations within the APE.....	11
Figure 5. Soil types within the APE.....	11

## INTRODUCTION

Between September and November 2008, at the request of Webber and Webber Mining Consultants, Inc., CRM TECH performed a paleontological resource assessment on approximately 298 acres of vacant land, including an existing quarry, in an unincorporated area near the community of Lucerne Valley, San Bernardino County, California (Fig. 1). The study is a part of the environmental review process for a proposed amendment to Reclamation Plan No. 86M-04, which would increase the area authorized for the White Knob-White Ridge Limestone Mine operated by OMYA California, Inc., under permit by the County of San Bernardino and the U.S. Bureau of Land Management (BLM).

As currently proposed, the project includes an increase to the disturbance limits of the quarry operations by 147 acres to account for boulder roll-down to the north and the west; removal and stabilization of talus materials on the western slope to minimize future roll-down; expansion of an existing overburden site by 15 acres, 10 of which are currently undisturbed; the addition of three new overburden sites; and modification to an existing access road to the White Knob-White Ridge Limestone Mine.

The area of potential effects (APE) for the proposed project is located on Assessor's Parcel Nos. 446-011-04, -05, and -06 and 446-021-11 and -35, within Sections 5-8 of T3N R1W, San Bernardino Base Meridian, as depicted in the USGS Butler Peak, Calif., 7.5' quadrangle (Fig. 2). A total 47.5 acres of the APE consists of U.S. government land under the jurisdiction of the BLM. The purpose of the present study is to provide the BLM with the necessary information and analysis to determine whether the proposed project would potentially disrupt or adversely affect any paleontological resources, and to design a paleontological salvage program for the project, if it becomes necessary.

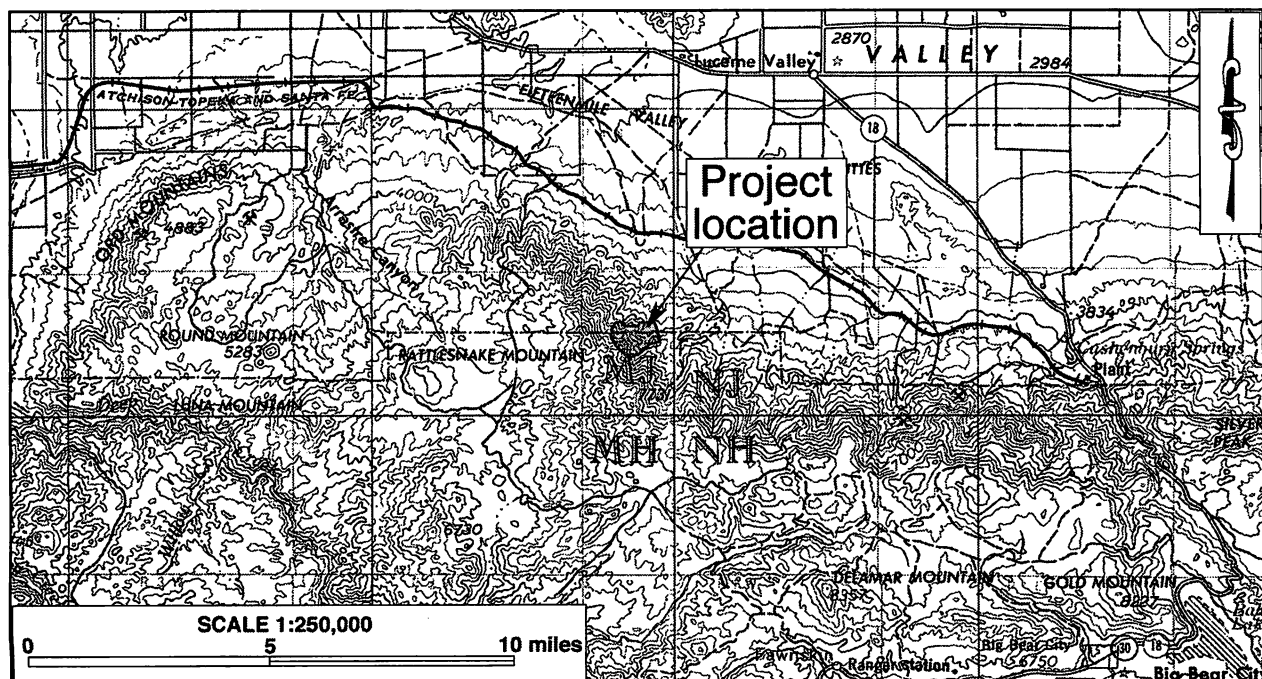


Figure 1. Project vicinity. (Based on USGS San Bernardino, Calif., 1:250,000 quadrangle)



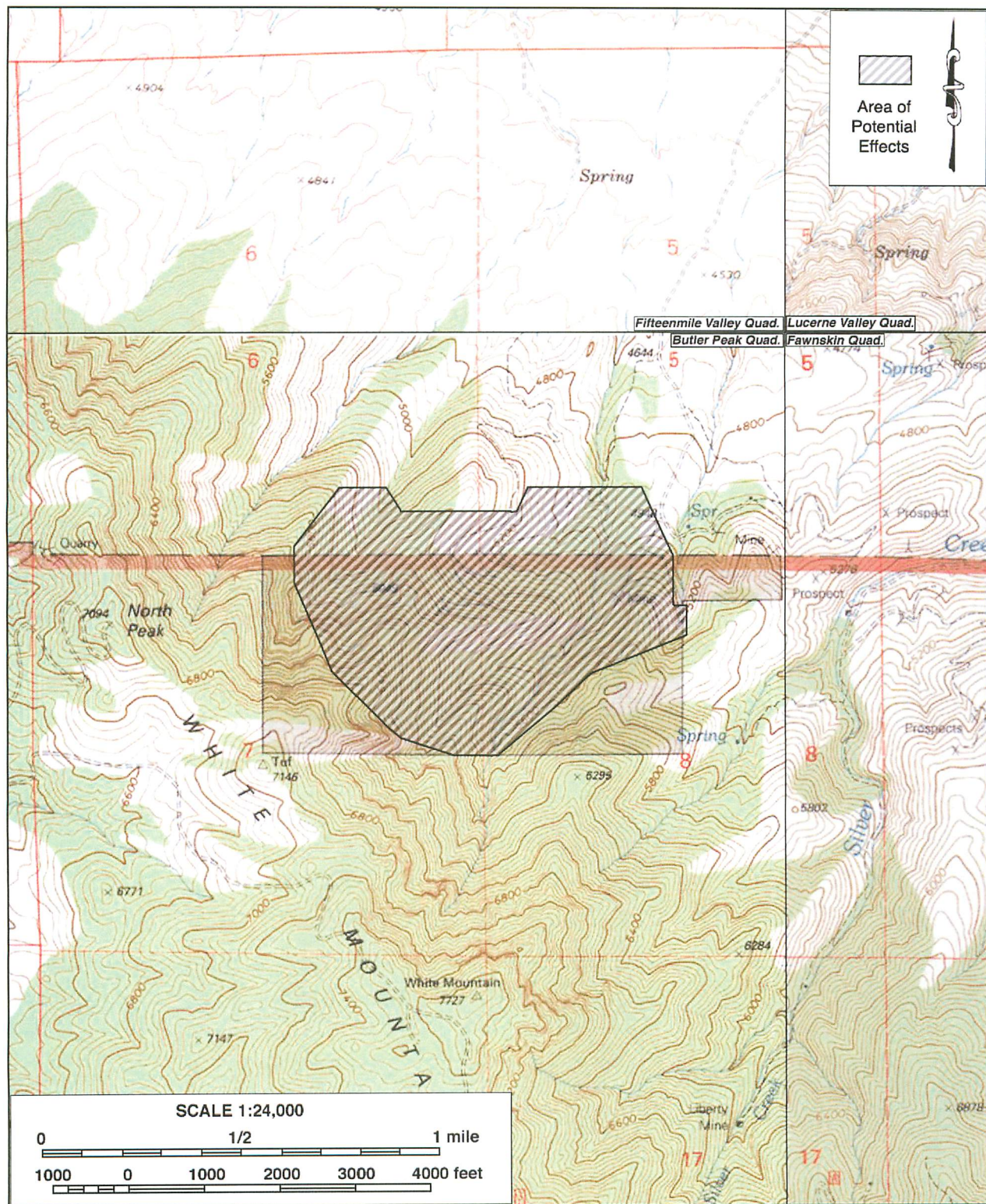


Figure 2. The area of potential effects. (Based on USGS Butler Peak, Fawnskin, Fifteenmile Valley, and Lucerne Valley, Calif., 1:24,000 quadrangles)

In order to identify any paleontological resource localities that may exist in or near the APE and to assess the possibility for such resources to be encountered in future excavation and construction activities associated with the proposed project, CRM TECH initiated records searches at the San Bernardino County Museum and the Natural History Museum of Los Angeles County, conducted a literature search, and carried out a systematic field survey of the APE, in accordance with the guidelines of the Society of Vertebrate Paleontology. The following report is a complete account of the methods, results, and final conclusion of this study.

## **PALEONTOLOGICAL RESOURCES**

### **DEFINITION**

Paleontological resources represent the remains of prehistoric life, exclusive of any human remains, and include the localities where fossils were collected as well as the sedimentary rock formations in which they were found. The defining character of fossils or fossil deposits is their geologic age, which is typically regarded as older than 10,000 years, the generally accepted temporal boundary marking the end of the last late Pleistocene glaciation and the beginning of the current Holocene epoch.

Common fossil remains include marine shells; the bones and teeth of fish, reptiles, and mammals; leaf assemblages; and petrified wood. Fossil traces, another type of paleontological resources, include internal and external molds (impressions) and casts created by these organisms. These items can serve as important guides to the age of the rocks and sediments in which they are contained, and may prove useful in determining the temporal relationships between rock deposits from one area and those from another as well as the timing of geologic events.

Fossil resources generally occur only in areas of sedimentary rock (e.g., sandstone, siltstone, mudstone, claystone, or shale). Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered to be nonrenewable paleontological resources. Occasionally fossils may be exposed at the surface through the process of natural erosion or as a result of human disturbances; however, they generally lay buried beneath the surficial soils. Thus, the absence of surface fossils does not preclude the possibility of their being present within subsurface deposits, while the presence of fossils at the surface is often a good indication that more remains may be found in the subsurface.

### **SIGNIFICANCE CRITERIA**

According to guidelines proposed by Eric Scott and Kathleen Springer (2003) of the San Bernardino County Museum, paleontological resources can be considered to be of significant scientific interest if they meet one or more of the following criteria:

1. The fossils provide information on the evolutionary relationships and developmental trends exhibited among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;

3. The fossils provide data regarding the development of biological communities or the interactions between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; and/or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

## PALEONTOLOGICAL SENSITIVITY

The fossil record is unpredictable, and the preservation of organic remains is rare, requiring a particular sequence of events involving physical and biological factors. Skeletal tissue with a high percentage of mineral matter is the most readily preserved within the fossil record; soft tissues not intimately connected with the skeletal parts, however, are the least likely to be preserved (Raup and Stanley 1978). For this reason, the fossil record contains a biased selection not only of the types of organisms preserved but also of certain parts of the organisms themselves. As a consequence, paleontologists are unable to know with certainty, the quantity of fossils or the quality of their preservation that might be present within any given geologic unit.

Sedimentary units, which are paleontologically sensitive, are those geologic units (mappable rock formations) with a high potential to contain significant nonrenewable paleontological resources. More specifically, these are geologic units within which vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or are likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent as well as sedimentary rock units temporally or lithologically amenable to the preservation of fossils.

A geologic formation is defined as a stratigraphic unit identified by its lithic characteristics (e.g., grain size, texture, color, and mineral content) and stratigraphic position. There is a direct relationship between fossils and the geologic formations within which they are enclosed, and with sufficient knowledge of the geology and stratigraphy of a particular area, it is possible for paleontologists to reasonably determine its potential to contain significant nonrenewable vertebrate, invertebrate, marine, or plant fossil remains.

The paleontological sensitivity for a geologic formation is determined by the potential for that formation to produce significant nonrenewable fossils. This determination is based on what fossil resources the particular geologic formation has produced in the past at other nearby locations. Determinations of paleontologic sensitivity must consider not only the potential for yielding vertebrate fossils but also the potential for a few significant fossils that may provide new and significant taxonomic, phylogenetic, and/or stratigraphic data.

The Society of Vertebrate Paleontology (1995:22-27) issued a set of standard guidelines intended to assist paleontologists to assess and mitigate any adverse effects/impacts to nonrenewable paleontological resources. The Society defined three potential categories of paleontological sensitivity for geologic units that might be impacted by a proposed project. These categories are described below, along with the criteria used to establish their sensitivity.



- **High sensitivity:** Geologic units assigned to this category are considered to have a high potential for significant nonrenewable vertebrate, invertebrate, marine, or plant fossils. Sedimentary rock units in this category contain a relatively high density of recorded fossil localities, have produced fossil remains in the vicinity, and are very likely to yield additional fossil remains.
- **Low sensitivity:** Geologic units are assigned to this category when they have produced no or few recorded fossil localities and are not likely to yield any significant nonrenewable fossil remains.
- **Undetermined sensitivity:** Geologic units are assigned to this category when there is limited exposure of the rock units in the area and/or the rock units have been poorly studied.

## ENVIRONMENTAL SETTING

### GEOLOGIC SETTING

The APE lies on the north flank of the San Bernardino Mountains, approximately six miles southwest of the small unincorporated community of Lucerne Valley, overlooking the Lucerne and Fifteenmile valleys on the southern rim of the Mojave Desert. The San Bernardino Mountains constitute a portion of the Transverse Ranges Geomorphic Province (Jenkins 1980:40-41; Harms 1996:169-172). These mountains have been uplifted to their present elevation during the last two million years by tectonic activity through a series of faults associated with the San Andreas Fault System and a series of high angle and thrust faults along the northern flank, separating the mountains from the Mojave Desert (Bailey and Jahns 1954: 103-104; Harms 1996: 170; Trent 1990:1). Most geologists consider these mountains to have been elevated during the past two million years, and they continue to rise in elevation even today (Harms 1996: 170; Trent 1990: 3). In support of such a relatively youthful age for the mountains are the deep, narrow canyons that fringe the flanks of the mountain range.

The uplift of the mountains occurred in two stages. The first stage is represented by block faulting and warping that likely took place during the late Miocene, approximately 5 to 11 million years ago (mya), which may have created an ancestral pre-San Bernardino Mountains of unknown elevation (Meisling and Weldon 1989). The second stage began with the uplift of the range in the Quaternary Period, starting approximately two mya, which created the elevated and eroding landscape that is visible today (Dibblee 1975; Sadler 1982).

The Morongo and the Twentynine Palms valleys separate the San Bernardino Mountains from the older Little San Bernardino Mountains located to the east. The northern portion of the San Bernardino Mountains was once a part of a late Precambrian-Paleozoic sea that was a southwest continuation of the Cordilleran miogeocline (Brown 1986:105; 1990:8). Among the Paleozoic sediments were some very extensive carbonate sequences of both limestones and dolomites (Brown 1986:110; 1990:13). These Paleozoic sediments were intruded upon by Jurassic- and Cretaceous-age igneous rock that metamorphosed most of the carbonate rock into marble (Brown 1986:105; 1990:8; Gantenbeim 1989: 101; 1990:20).

## CURRENT NATURAL SETTING

Dictated by its desert setting, the climate and environment of the region around the APE are typical of the southern California high desert country, so-named because of its relatively high elevation in comparison to the Colorado Desert, or low desert, to the southeast. The climate is marked by extremes in temperature and aridity, with summer highs reaching well over 110°F and winter lows dipping below freezing. Average annual precipitation levels are less than five inches.

The APE lies approximately six miles south of State Highway 18 and five miles west of Crystal Creek Road. A large portion of the APE is currently in use by the existing quarry operations. The terrain is steep and rugged, with several large drainages located north of the quarry (Fig. 3). Elevations in the APE range between 4,850 feet and 6,600 feet above mean sea level. A number of large bedrock outcrops and boulders are situated along the slopes and within the drainages. Vegetation within the APE includes Joshua trees, pines, oaks, cactus, chollas, tumbleweeds, junipers, and Manzanita bushes, along with the typical amalgamation of small desert grasses and low-lying shrubs (Fig. 3).



Figure 3. Typical landscapes within the APE. *Clockwise from upper left:* steep hillside being quarried; rugged hillside terrain and drainage; haul road leading to the quarry; dense, low-lying vegetation and rolling terrain (facing northeast). (Photos taken on October 2, 2008)

## METHODS AND PROCEDURES

### RECORD SEARCHES

The records search service was provided by the Regional Paleontologic Locality Inventory located at the San Bernardino County Museum in Redlands and by the Natural History

Museum of Los Angeles County in Los Angeles. These institutions maintain files of regional paleontological localities as well as supporting maps and documents. The records search results identify geological exposures and formations, as well as known paleontological localities within the vicinity of the study area.

## **LITERATURE REVIEW**

In addition to the records searches, a literature search was conducted using materials in the CRM TECH library, including unpublished reports produced during surveys of other properties in the area, and the personal library of CRM TECH geologist/paleontologist Harry M. Quinn, California Professional Geologist #3477 (see App. 1 for qualifications).

## **FIELD SURVEY**

On October 2 and 3, 2008, CRM TECH paleontological surveyors Daniel Ballester, Robert Porter, and Andrea Stella (see App. 1 for qualifications) carried out the pedestrian field survey of the APE under the direction of Harry M. Quinn. The relatively level areas of the APE were surveyed intensively by walking parallel north-south transects spaced 15 meters (approx. 50 feet) apart. Since such regular transects were impracticable on the steep slopes, the more rugged terrain in the APE was surveyed by inspecting all areas accessible or demonstrating the potential for sediments suitable for fossil preservation. In this way, the entire APE was examined systematically to determine the soil types, to verify the geological formations, and to look for any indications of paleontological remains. Ground visibility ranged from poor (25%) to fair (70%) depending upon the density of the vegetation.

## **RESULTS AND FINDINGS**

### **RECORDS SEARCHES**

The Natural History Museum of Los Angeles County (NHMLAC) found no known paleontological localities within the APE or nearby from similar sediment lithologies to that occurring within the APE (McLeod 2008). A review of the Regional Paleontologic Locality Inventory by the San Bernardino County Museum (SBCM) indicates that no paleontological localities are recorded within the APE and no localities are recorded within several miles of the APE in any direction (Scott 2008).

According to the NHMLAC, in the lowest portion of the APE and along many of the drainages there are surficial deposits of older Quaternary alluvium. These deposits, which are primarily fan deposits from the surrounding elevated terrain, will typically not contain significant vertebrate fossils, at least not in the uppermost layers (McLeod 2008). Geologic mapping indicates there are exposures of the Mississippian (early Carboniferous) Furnace Limestone within the central portion of the APE. Despite this limestone being somewhat metamorphosed, it does contain recognizable invertebrate fossils and could potentially contain the remains of vertebrate fossils (*ibid.*). The remainder of the APE contains Paleozoic metamorphic rocks and Mesozoic plutonic igneous rocks, both of which will be devoid of fossils.



The NHMLAC has determined that excavations that will penetrate into the Paleozoic metamorphic and the Mesozoic igneous bedrock found throughout the majority of the APE will not encounter any vertebrate fossils. In addition, surface grading or shallow excavations into the older Quaternary alluvium found in the northeastern portion of the APE are also unlikely to uncover significant vertebrate fossils since this older alluvium is shallow and underlain by igneous bedrock exposed in the surrounding terrain. Because of its lithology, it is unlikely to yield any significant vertebrate fossils. McLeod (2008) goes on to note that excavations within the Furnace Limestone Formation within the central portion of the APE, and not within BLM land, could potentially yield highly significant vertebrate fossils of late Paleozoic age that are otherwise poorly known in California.

The results of the records search conducted by the SBCM indicate that the APE contains a number of rock units from several different geological ages. From oldest to youngest, these rock units include metamorphosed limestone and marble from the later Paleozoic Era; quartz monzonite from the Jurassic or Cretaceous Period; Quaternary older fan deposits, and gneiss of indeterminate age (Scott 2008). None of these geologic formations has the potential to contain significant nonrenewable fossil resources, particularly the Paleozoic and Mesozoic metamorphic and granitic rocks, as well as the gneiss. The Quaternary fan deposits were laid down in a depositional environment that is not conducive to the process of fossilization. As a result, the SBCM has assigned all the geologic formations present within the APE a low sensitivity for yielding significant nonrenewable paleontological resources (*ibid.*).

## LITERATURE REVIEW

Metamorphosed limestone and dolomite in the San Bernardino Mountains were first studied by Vaughan (1922), who grouped them within his Of classification, or Furnace limestone of Upper Cambrian and Ordovician age. The type location can be found on the northeast side of Horse Thief Flat, where it conformably overlies the Arrastre quartzite. Vaughn's geologic mapping, however, does not extend into the current APE.

Jahns (1954) mapped the surface geology within the APE as **gr**, or Plutonic rocks, mainly of granitic to quartz diorite composition of Mesozoic age and **gn**, or gneiss and other metamorphic rocks, mainly of complex origin from the Mesozoic to Precambrian age. Bortugno and Spittler (1986) mapped the surface geology for the APE as **Pzls**, **KJqm**, **Trmz**, **Jhd**, **Qod**, and **Q**. The **Pzls** is defined as Upper Paleozoic limestone and marble, the **KJqm** as Cretaceous or Jurassic quartz monzonite Quartz Monzonite of Pleasant View Ridge, the **Trmz** as Triassic monzonite, the **Jhd** as Jurassic hornblende diorite and minor gabbro, the **Qod** as well dissected alluvial fans of Pleistocene age, and the **Q** as alluvium (*Undifferentiated*) of Holocene age. The **Qod** is limited to the upper part of the canyon in the northeast portion of the APE, where the road comes in from Lucerne Valley.

The limestone and marble mining that has taken place along the base of the San Bernardino Mountains began in the early 1950s when Kaiser constructed a railroad spur line connecting the area to their Cushenbury Quarry, located south of Lucerne Valley (Fife 1988:176). Quarrying of limestone and marble along the north flank of the San Bernardino Mountains not only has continued to the present, but also has been expanding during much of that time. This mining activity has contributed to the amount of detailed geologic mapping that has occurred in the area.

Fife (1982:550) details a map of the prospects and mines for carbonate resources within the White Mountain carbonate deposits, including those in the APE. He identified three claims within the APE: the White Knob (Engelhard) in Section 7, the White Ridge (Kaiser Steel) in Section 8, and the Guilixon (Pfizer) also in Section 8. A core sample drawn from the White Knob claim yielded a coarse crystalline calcite marble with no limestone present (*ibid.*:559).

According to Harms (1996:170), approximately three-quarters of the rocks exposed are granites, between 70 and 85 million years old. Fossiliferous limestones dated to approximately 300 million years ago occur on the north and east slopes of the San Bernardino Mountains. Evidence of a few lava flows that occurred approximately five million years ago is visible on the north and east slopes, in addition to relatively recent alluvial deposits.

Gantenbein (1986:101; 1990:19) mapped the geology at the Cushenbury Quarry in great detail and determined that the limestone in the quarry had been metamorphosed by both regional and contact metamorphism, transforming it into various metamorphic grades of calcite marble. Earlier mapping had apparently included the marbles at the Cushenbury quarry with the Furnace Limestone (*ibid.*). Gantenbein (*ibid.*) indicates the upper portion of the Furnace Limestone is Mississippian and Pennsylvanian in age, based on the analysis of the megafossils found in the formation. Hollenbaugh (1968) asserts it is Permian. Brown (1986:109; 1990:12) identified areas of weak metamorphism, and disclosed several fossil locations. Carboniferous megafossils have been reported by Richmond (1960), and conodont<sup>1</sup> studies by Ozanich (1982) and Wardlaw (1984) indicated Pennsylvanian (Morrowan) strata are present.

Brown (1986:105-109; 1990:8-12) identified rocks of Precambrian through upper Paleozoic age along the north flank of the San Bernardino Mountains, correlating them with similarly aged rocks in the Eastern Mojave Desert region. His detailed mapping identified several Upper Paleozoic formations and their members including the Devonian-age Sultan Limestone, Mississippian Monte Cristo Limestone, and the Pennsylvanian through Permian Bird Springs Formation (*ibid.*). A stratigraphic chart for the northern San Bernardino Mountains is shown as Table 1 (Brown 1986:110; 1990:13), and the correlation of this sequence with sequences in other areas are shown as Figure 5 (Brown 1986:112; 1990:15) and Figure 6 (Brown 1986:113; 1990:16). Brown (1986; 1990) no longer uses the terminology "Mississippian Furnace Limestone" for any of the rocks that he mapped.

Note that the Devonian Sultan Limestone contains a dark colored dolomite of the Ironsides Member, a white to buff colored laminated and texturally massive dolomite of the Valentine Member, and a white limestone of the Crystal Pass Member. The Mississippian Monte Cristo Limestone consists of an interlayered dark- and light-gray limestone of the Dawn and Anchor Members, a white limestone of the Bullion Member, and heterogeneous limestone and dolomite of the Yellowpine Member. The Mississippian and Pennsylvanian Bird Spring Formation consists of a basal member of quartzite, siltstone, and impure limestone; a lower member of white coarsely crystalline limestone; a middle member of medium- and dark-gray, quartz-sand and chert-bearing limestone, and an upper member of light- and medium-gray limestone.

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<sup>1</sup> Conodonts are the most widespread Paleozoic microfossils and are important for biostratigraphic indexing.



Brown (1994:7) notes that the "Mississippian Monte Cristo Limestone Bullion member is exposed in the White Knob quarry area and forms the orebody." He further notes that the "Conodont color index measurements indicate metamorphic temperatures of over 430°C." (*ibid.*). Based on his temperature findings, there must be conodonts, or fossils, present somewhere within the quarry area. Note that the "White Knob quarry produces high-purity limestone used for numerous commercial and industrial applications, including foods, pharmaceuticals, and paints. The high-purity limestone deposits required for these applications are typically white in color. The more common gray limestone deposits are not considered suitable for such applications" (Davis 2008:3).

Brown (1994:7) also indicates that the "Bird Springs Formation in the quarry area is a dark grey to black impure limestone and dips gently toward the south." He remarks that "Formations or members which have been recrystallized and bleached to white calcite marble include Devonian Sultan Limestone, Crystal Pass Member, Mississippian Monte Cristo Limestone Bullion Member, and portions of the Bird Springs Formation of Pennsylvanian-Permian age" (*ibid.*:3). The fact that the Bird Springs Formation in the quarry area is a gray limestone (Brown 1994:7; Brown 2008:363; Davis 2008:3), suggests that it has not been completely metamorphosed to marble. While the gray limestone of the Bird Springs Formation is not the main orebody, portions of it may be disturbed to get at the main, high-purity, white limestone orebody.

Dibblee (2008) mapped the surface geology within the APE as **hqm**, **mqm**, **qm**, **fl**, **sq**, **Qoa**, **Qof**, and possibly a minor amount of **hdg**. The **hqm** is described as hornblende quartz monzonite of Jurassic age, the **mqm** as migmatite of Jurassic age, the **qm** as quartz monzonite of Cretaceous age, the **fl** as Furnace Limestone of Mississippian age, the **sq** as Saragossa Quartzite of Paleozoic age, the **Qoa** as older alluvium of Pleistocene age, the **Qof** as older fanglomerates of Pleistocene age, and the **hdg** as hornblende diorite and gabbro of Cretaceous age (*ibid.*). The Furnace Limestone Formation, or the Furnace Formation (Richmond 1960), is described as mostly marble, locally conformable on Saragossa Quartzite, and elsewhere intruded by igneous rocks of Mississippian age, as suggested by crinoid and bryozoan fossils (Richmond 1960) (cf., Vaughan 1922).

Miller et al. (n.d.) mapped the geology within the APE as **Qc** or Modern colluvial deposits from the late Holocene, **Qs** or surficial deposits undifferentiated from the late Holocene, **Qof** or old deposits of alluvial fans from the late to middle Pleistocene, **Mzu** or undivided Mesozoic granitic rocks, **KJdg** or mixed diorite and gabbro from the Cretaceous and Jurassic age, **Trf** Monzonite of Fawnskin from the Triassic, **PPbs** or the Bird Spring Formation from the Pennsylvanian age, and **Mm** or Monte Cristo Limestone from the Mississippian age (Fig. 4).

Mapping by the National Resources Conservation Service (NRCS 2008) lists several soil types and rock outcrops within the APE, including the Arrastre rock outcrop complex [101], the Bryman-Cajon association [110], the Crafton-Sheephead rock outcrop association [121], Yermo gravelly sandy loam [176], and the Wapi-Pacifico dry rock outcrop complex [DxF and DxG] (Fig. 5).

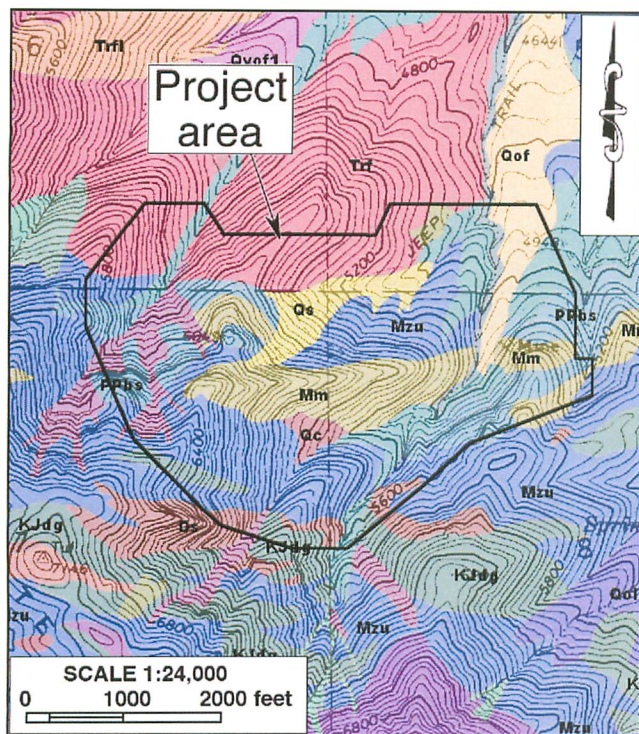


Figure 4. Geologic formations within the APE.  
(Source: Miller et al. n.d.)

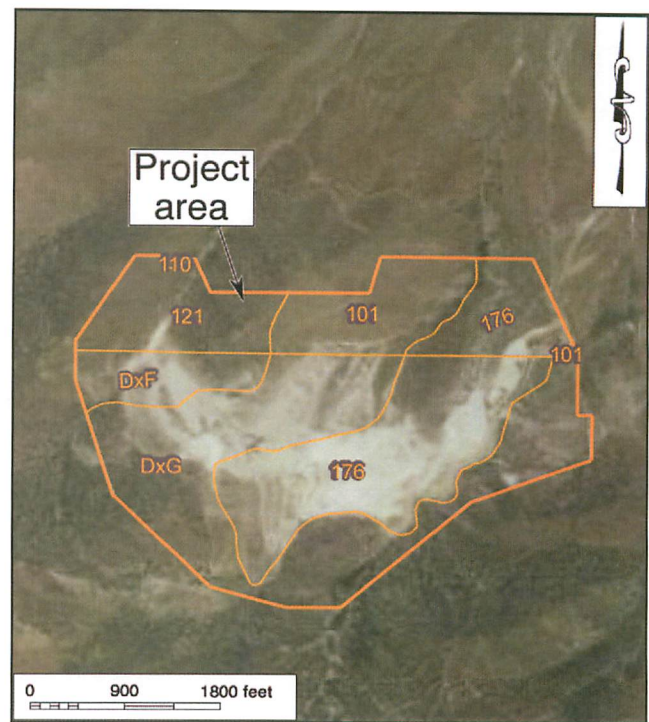


Figure 5. Soil types and rock outcrops in the APE.  
(Source: NRCS n.d.)

## FIELD SURVEY

The field survey produced negative results for any surface indications of paleontological resources within or adjacent to the APE. Surface soils were confirmed in the field as representing a gravelly, sandy loam matrix. Much of the APE has been disturbed by the on-going mining activities and the construction of access roads, and large piles of quartz mining refuse are scattered throughout the area.

However, OMYA California's geologist Howard Brown, who is intimately familiar with the White Knob quarry has supplied additional observations regarding the quarry site. He notes that "Although rocks correlative with the Monte Cristo Limestone Formation are present in the APE they have been metamorphosed by repeated regional and contact metamorphism to upper amphibolite grade and granulite grade (high temp high pressure) and ALL of the limestone has been metamorphosed to marble, there is no remaining limestone that has not been metamorphosed. Based on 20 years of mining it can be stated with certainty the potential for virtually any paleontological resources in igneous and metamorphosed rocks at the APE is nil" (Brown 2009). Brown also notes that rocks at the quarry are highly metamorphosed, coarse grained calcite marble and—based on detailed field observations, sampling, drilling, and 20 years of mining—are not known to contain any fossils (Brown 2009). He states that the possibility of finding non-metamorphosed fossiliferous limestones at the quarry is non-existent.

Apparently there are pockets of non-metamorphosed limestone at the quarry. It is possible, then, that some of these limestone pockets might contain remnant fossils, since fossils have been recovered from such limestone deposits in other portions of the metamorphic belt along the north flank of the San Bernardino Mountains (Richmond 1960; Hollenbaugh 1968; Gantenbein 1986:101; 1990:19; Brown 1994). Note, however, that the Monte Cristo Limestone Formation, within which pockets of non-metamorphosed limestone are likely to be found, are present in the center of the APE and not within BLM lands.

## DISCUSSION

The primary ore being quarried at this location is a very coarse crystalline marble with portions containing some very large calcite crystals. The Furnace Limestone, as mapped in the project area by Dibblee and now referred to as the Monte Cristo Limestone Formation, contains a significant amount of marble, which has a low potential for containing any paleontological resources. However, scattered small pockets of moderate to slightly metamorphosed limestone have been found within these large deposits of marble, and it is possible that this limestone may contain fossil remains, given that fossils have been recovered from limestone deposits found elsewhere in the area. These limestone pockets, though, appear to constitute a small percentage of the Monte Cristo Limestone and, since the higher-grade marble is the target ore for the mining operation, continuous monitoring would not be appropriate from a paleontologic, economic, or safety standpoint.

The presence of the relatively small and infrequent pockets of potentially fossil-bearing limestone may account for the discrepancy in the sensitivity assessments between the SBCM and the NHMLAC. While the SBCM has assigned a low paleontological sensitivity for the Monte Cristo Limestone because "the Paleozoic and Mesozoic metamorphic and granitic rocks...do not preserve fossils" (Scott 2008:1), the NHMLAC notes that "excavations in the Furnace Limestone exposed in the central portion of the proposed project area could potentially recover highly significant vertebrate fossils of late Paleozoic age" (McLeod 2008:2). McLeod is presumably referring to the moderate to slightly metamorphosed limestone that appears to constitute a very small percentage of the Monte Cristo Limestone Formation.

## CONCLUSION AND RECOMMENDATIONS

Based on the research results discussed above, the proposed project's potential to impact significant nonrenewable paleontological resources appears to range from low to indeterminate, depending upon the type of rock encountered during mining operations. The surficial deposits of older Quaternary alluvium found within the drainages and in the lowest portion of the APE are unlikely to contain significant fossils, at least in the uppermost layers, and are considered to have a low potential. The Paleozoic metamorphic rocks and Mesozoic plutonic igneous rocks in the balance of the APE are also considered to have a low potential for significant fossil remains. Therefore, no paleontological monitoring of earth-moving activities is recommended within the alluvial soils, the highly metamorphosed rock, or the igneous rock.

However, there is the possibility that pockets of lesser metamorphosed limestones could be encountered within the areas of marble. Fossils have been found in similar formations in the area. Therefore, this limestone has to be assigned an undetermined potential for containing significant nonrenewable paleontological remains, primarily invertebrate fossils. Based on long-term, first hand observations, though, the possibility of finding non-metamorphosed fossiliferous limestones at the quarry is very low.

Thus, it is recommended that in the extremely unlikely and remote possibility that non-metamorphosed fossiliferous limestones are encountered during the mining activities, they would be set aside for examination by a qualified paleontologist. If any fossil bearing materials are encountered, a program to mitigate impacts to such resources that might be exposed or unearthed, is recommended. The program should be developed in accordance with the proposed guidelines of the Society of Vertebrate Paleontology, and should include, but not be limited to, the following:

- All non-metamorphosed fossiliferous limestones that are encountered during mining should be stockpiled for examination by a qualified paleontologist. The monitor should be prepared to quickly salvage any fossils that might be present. The monitor should also remove samples of sediments that are likely to contain the remains of small fossil vertebrates and invertebrates.
- Collected samples of sediments should be processed to recover small invertebrate and vertebrate fossils. Recovered specimens should be prepared so that they can be identified and permanently preserved.
- Any specimens should be identified, curated, and placed into a repository with permanent retrievable storage.
- A report of findings, including an itemized inventory of recovered specimens, should be prepared upon completion of the steps outlined above. The report should include a discussion of the significance of all recovered specimens. The report and inventory, when submitted to the appropriate Lead Agency, would signify completion of the program to mitigate impacts to paleontological resources.



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**APPENDIX 1**

**PERSONNEL QUALIFICATIONS**



## **PROJECT GEOLOGIST/PALEONTOLOGIST**

### **Harry M. Quinn, M.S.**

#### **Education**

- 1968 M.S., Geology, University of Southern California, Los Angeles, California.  
1964 B.S. Geology, Long Beach State College, Long Beach.  
1962 A.A., Los Angeles Harbor College, Wilmington, California.

- Graduate work oriented toward invertebrate paleontology; M.S. thesis completed as a stratigraphic paleontology project on the Precambrian and Lower Cambrian rocks of Eastern California.

#### **Professional Experience**

- 2000- Project Paleontologist, CRM TECH, Riverside/ Colton, California.  
1998- Project Archaeologist, CRM TECH, Riverside/ Colton, California.  
1992-1998 Independent Geological/ Geoarchaeological/ Environmental Consultant, Pinyon Pines, California.  
1994-1996 Environmental Geologist, E.C E.S., Inc, Redlands, California.  
1988-1992 Project Geologist/ Director of Environmental Services, STE, San Bernardino, California.  
1987-1988 Senior Geologist, Jirsa Environmental Services, Norco, California.  
1986 Consulting Petroleum Geologist, LOCO Exploration, Inc. Aurora, Colorado.  
1978-1986 Senior Exploration Geologist, Tenneco Oil E & P, Englewood, Colorado.  
1965-1978 Exploration and Development Geologist, Texaco, Inc., Los Angeles, California.

#### **Previous Work Experience in Paleontology**

- 1969-1973 Attended Texaco company-wide seminars designed to acquaint all paleontological laboratories with the capability of one another and the procedures of mutual assistance in solving correlation and paleo-environmental reconstruction problems.  
1967-1968 Attended Texaco seminars on Carboniferous coral zonation techniques and Carboniferous smaller foraminifera zonation techniques for Alaska and Nevada.  
1966-1972, 1974, 1975 Conducted stratigraphic section measuring and field paleontological identification in Alaska for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic and Mesozoic rocks and some Tertiary rocks, including both megafossil and microfossil identification, as well as fossil plant identification.  
1965 Conducted stratigraphic section measuring and field paleontological identification in Nevada for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic rocks and some Mesozoic and Tertiary rocks. The Tertiary work included identification of ostracods from the Humboldt and Sheep Pass Formations and vertebrate and plant remains from Miocene alluvial sediments.

#### **Memberships**

Society of Vertebrate Paleontology; American Association of Petroleum Geologists; Canadian Society of Petroleum Geologists; Rocky Mountain Association of Geologists, Pacific Section; Society of Economic Paleontologists and Mineralogists; San Bernardino County Museum.

#### **Publications in Geology**

Five publications in Geology concerning an oil field study, a ground water and earthquake study, a report on the geology of the Santa Rosa Mountain area, and papers on vertebrate and invertebrate Holocene Lake Cahuilla faunas.

**PALEONTOLOGICAL SURVEYOR/FIELD DIRECTOR**  
**Daniel Ballester, B.A.**

**Education**

1998 B.A., Anthropology, California State University, San Bernardino.  
1997 Archaeological Field School, University of Las Vegas and University of California, Riverside.  
1994 University of Puerto Rico, Rio Piedras, Puerto Rico.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.

**Professional Experience**

2002- Field Director, CRM TECH, Riverside/Colton, California.  
• Report writing, site record preparation, and supervisory responsibilities over all aspects of fieldwork and field crew.  
1999-2002 Project Archaeologist/Field Paleontologist, CRM TECH, Riverside, California.  
• Survey, testing, data recovery, monitoring, and mapping.  
1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.  
• Two and a half months of excavations on Topomai village site, Marine Corp Air Station, Camp Pendleton.  
1998 Field Crew, A.S.M. Affiliates, Encinitas, California.  
• Two weeks of excavations on a site on Red Beach, Camp Pendleton, and two weeks of survey in Camp Pendleton, Otay Mesa, and Encinitas.  
1998 Field Crew, Archaeological Research Unit, University of California, Riverside.  
• Two weeks of survey in Anza Borrego Desert State Park and Eureka Valley, Death Valley National Park.

**PALEONTOLOGICAL SURVEYOR**  
**Andrea Stella, B.S.**

**Education**

2003 B.S., Anthropology, University of California, Riverside.

**Professional Experience**

2002- Project Archaeologist, CRM TECH, Riverside/Colton, California.

**PALEONTOLOGICAL SURVEYOR**  
**Robert Allen Porter, B.A.**

**Education**

2000            B.A., Anthropology, California State University, San Bernardino.

**Professional Experience**

2001-           Project Archaeologist, CRM TECH, Riverside/Colton, California.  
                 • Trained in survey, excavation, and construction monitoring; experienced  
                 in field recording and reporting on cultural resources.  
2000           Archaeological field class under the direction of Claude Warren. Excavated  
                 units at Soda Lake in the Mojave Desert and produced lake bottom  
                 stratigraphic profiles and carbon sample collections.

**Honors and Awards**

Spring 2000   Dean's Honors List (G.P.A. of 4.0 in 15 units).  
Fall 2000      Dean's Honors List (G.P.A. of 3.9 in 12 units).

**REPORT WRITER**  
**Clarence Bodmer, B.A.**

**Education**

2000-2002    Graduate Program in Archaeology, University of Kentucky, Lexington.  
1996           B.A., Archaeology, University of California, Santa Barbara.

**Professional Experience**

2006-           Archaeologist/Report Writer, CRM TECH, Riverside/Colton, California.  
2006           Archaeologist, Tetra Tech, San Bernardino, California.  
2005-2006    Archaeologist, Discovery Works, Long Beach, California.  
2004-2005    Archaeological Technician, Statistical Research, Inc., Redlands, California.  
2003           Archaeological Technician, Wilbur Smith & Associates, Lexington, Kentucky.  
2000-2004    Archaeologist, Kentucky Archaeological Survey, Lexington, Kentucky.

**Honors and Awards**

2001-2002    Research Assistant, Department of Anthropology, University of Kentucky.  
1995-1996    Grant, University of California, Santa Barbara.  
1995-1996    Dean's Honor List, University of California, Santa Barbara.

**Memberships**

Society for American Archaeology.  
Society for California Archaeology.

**APPENDIX 2**

**RECORDS SEARCHES RESULTS**

24 September 2008

CRM Tech  
1016 East Cooley Drive, Suite B  
Colton, CA 92324

Attn: Nina Gallardo

re: Paleontological resources for the proposed White Knob Quarry Revision Project, CRM Tech # 2280-P (White Knob Expansion Paleo), near Lucerne Valley, San Bernardino County, project area

Dear Nina:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed White Knob Quarry Revision Project, CRM Tech # 2280-P (White Knob Expansion Paleo), near Lucerne Valley, San Bernardino County, project area as outlined on the section of the Butler Peak USGS topographic quadrangle map that you sent to me via fax on 22 September 2008. We do not have any vertebrate fossil localities that lie directly within the proposed project boundaries, nor do we have any localities anywhere nearby from rocks similar to those that occur in the proposed project area.

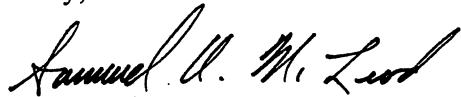
In the lowest lying portion of the proposed project area, along the drainage in the very northeastern portion, there are surficial deposits of older Quaternary Alluvium, primarily as fan deposits from the surrounding elevated terrain. These deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, and we have no vertebrate fossil localities anywhere nearby from these or similar deposits. Geologic mapping indicates there are exposures of the Mississippian (early Carboniferous) Furnace Limestone in the central portion of the proposed project area. Although the Furnace Limestone is somewhat metamorphosed, it does contain recognizable invertebrate fossils and potentially could also contain vertebrate fossils. Otherwise, bedrock in the proposed project area consists of Paleozoic metamorphic rocks and Mesozoic plutonic igneous rocks that, of course, will be devoid of fossils.

Excavations in the Paleozoic metamorphic and Mesozoic igneous bedrock found throughout most of the proposed project area will not encounter any vertebrate fossils. Surface grading or shallow excavations in the older Quaternary Alluvium in the very northeastern portion of the

proposed project area are unlikely to uncover significant vertebrate fossils. Because these Quaternary deposits are probably quite shallow and underlain by the igneous bedrock exposed in the surrounding elevated terrain, it is unlikely that any significant vertebrate fossils would be encountered during excavations in that portion of the proposed project area. Excavations in the Furnace Limestone exposed in the central portion of the proposed project area could potentially recover highly significant vertebrate fossils of late Paleozoic age that are otherwise very poorly known in California. Any substantial excavations in the Furnace Limestone exposures in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Any fossil materials uncovered during mitigation activities should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in black ink, reading "Samuel A. McLeod". The signature is written in a cursive style with a large, stylized initial 'S'.

Samuel A. McLeod, Ph.D.  
Vertebrate Paleontology

enclosure: draft invoice



# SAN BERNARDINO COUNTY MUSEUM

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(909) 307-2669 • Fax (909) 307-0539 • [www.sbcountymuseum.org](http://www.sbcountymuseum.org)  
TDD (909) 792-1462



COUNTY OF SAN BERNARDINO  
PUBLIC AND SUPPORT  
SERVICES GROUP

ROBERT L. McKERNAN  
Director

12 November 2008

CRM Tech  
attn: Nina Gallardo  
1016 E. Cooley Drive, Suite "B"  
Colton, CA 92324

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re: **PALEONTOLOGY LITERATURE / RECORDS REVIEW, WHITE KNOB QUARRY  
REVISION PROJECT, LUCERNE VALLEY REGION, SAN BERNARDINO  
COUNTY, CALIFORNIA**

---

Dear Ms. Gallardo,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named development in the Apple Valley region of San Bernardino County, California. Specifically, the property is located in portions of sections 5, 6, 7, and 8, Township 3 North, Range 1 West, San Bernardino Base and Meridian, as seen on the Butler Peak, California 7.5' United States Geological Survey topographic quadrangle map (1971 edition).

Previous geologic mapping (Bortugno and Spittler, 1986) indicates that excavation within the boundaries of the study area will incise rock units of several different geologic ages. These include, from oldest to youngest: metamorphosed limestone and marble dating to the later Paleozoic Era (= unit **P<sub>2</sub>ls**); quartz monzonite dating to the Jurassic or the Cretaceous Period (= **KJqm**); and Quaternary older fan deposits (= **Qod**), as well as gneiss of indeterminate age (= **m<sub>1</sub>**). Of these geologic formations, none have the potential to contain significant nonrenewable paleontologic resources. The Paleozoic and Mesozoic metamorphic and granitic rocks, as well as the gneiss of indeterminate age, do not preserve fossils. The Quaternary fan deposits were laid down in a depositional environment that is not conducive to the process of fossilization. For this reason, all of the rock units present within the boundaries of the proposed study area are assigned low paleontologic sensitivity.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously known paleontologic resource localities are recorded by the SBCM from within the boundaries of the proposed study area, nor from within several miles in any direction. The nearest recorded paleontologic resource localities (SBCM 1.94.4 - 1.94.5 and 1.94.10) are situated approximately 5½ miles to the northeast of the proposed study area; these localities were identified from sediments not present in the study area.

MARK H. UFFER  
County Administrative Officer  
NORMAN A. KANOLD  
Assistant County Administrator  
Public and Support  
Services Group

Board of Supervisors  
BRAD MITZELFELT ..... First District      NEIL DERRY ..... Third District  
PAUL BIANE ..... Second District      GARY C. OVITT ..... Fourth District  
JOSIE GONZALES ..... Fifth District

RECEIVED DEC 17 2008

## Recommendations

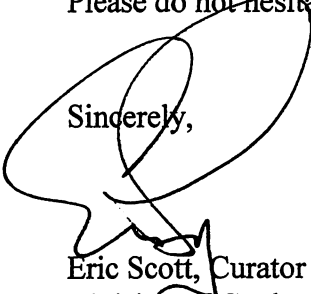
The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in Paleozoic, Mesozoic, and Quaternary deposits has low potential to adversely impact significant nonrenewable paleontologic resources. These sediments have low paleontologic sensitivity. *No program to mitigate adverse impacts to nonrenewable paleontologic resources is recommended at this time.*

## References

Bortugno, E.J. and T. E. Spittler, 1986. Geologic map of California, San Bernardino sheet, scale 1:250,000. California Division of Mines and Geology Regional Geologic Map Series, Map 3A.

Please do not hesitate to contact us with any additional questions you may have.

Sincerely,



Eric Scott, Curator of Paleontology  
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San Bernardino County Museum